JPRS 79639

10 December 1981

USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 13

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

JPRS 79639

10 December 1981

USSR REPORT

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 13

CONTENTS

BIOCHEMISTRY

Microbiologic Aspects of Metal Corrosion........................... 1

All-Union Conference 'New Sources of Food Protein and Their Application'... 10

Ecological and Technological Problem of Biodamages................ 13

Conference on Plant Virology...................................... 16

Bacterial Breakdown of Cutting Fluids and Methods of Preventing It.. 19

Influence of Herbicides on Susceptibility of Cabbage and Tomatoes to Bacterial Diseases.................................. 20

'Standard' and 'Defective' Populations of Flu Virus A/Swine/1976/31 and Their Role in Formation of Persistent Infection in Cell Culture... 21

Characteristics of Viruses Separated in Persistent Infection With A/Swine/1976/31 Virus in Monkey Kidney Cell Culture........ 21

Influence of Cations on Elution of Enteroviruses Adsorbed on Bentonite.. 22

Influence of Conditions and Duration of Storage of Densonucleosis Virus of Aedes Aegypti on Its Infectious Properties.. 23

Disruption of Mitotic Status of Hep-2 Cells Under Influence of Various Mycotoxins.. 23

Antimicrobial Activity of N-(4-Phenyl-3-Methyl-2-Butenyl)-Carbnonoxymethyl-Piperidinium Chloride........................... 24

Specifics of Structure of Comovirus Genome........................... 24

Compatibility of pAP43 Genetic Transfer Factor (F-Like Factor) With Plasmids of F Incompatibility Group........................ 25

BIOTECHNOLOGY

Studitskiy Reviews 'RECEPTOR EVOLUTION' Book...................... 26

ENVIRONMENT

Ecology of Predatory Mite Amblyseius Similis Koch, 1839 (Mesostigmata, Phytoseiidae) and Its Potential Use in Biological Control.. 30

Importance of Terrestrial Predators in Spread of Plague on Apsheron Peninsula.. 30

MEDICAL DEMOGRAPHY

Morbidity of Rectal Cancer in Moscow.............................. 32

MEDICINE

Current Basic Directions of Scientific Investigations on General Epidemiology and Prophylaxis for Infectious Diseases.... 33

Evaluation of Anti-Anthrax Immunity Strength in Experiments on Animals Using Indirect Immunofluorescence Method............... 39

Effectiveness of Preseasonal Seroprophylaxis for Hepatitis A Using Different Doses of 10 Percent Commercial Immunoglobulin... 41

Stability of Basic Properties of Live Anthrax Vaccine Prepared in Liquid and Solid Culture Media................................ 52

Fourth Soviet-Mongolian Conference of Specialists From Antiplague Institutes.. 54

Pressing Problems of Advanced Training of Military Medical Personnel in Medical Corps Intern-Training Facilities........... 56

Efficacy of Some Methods of Controlling Incorporation of Radionuclides in Wounds... 61

Current Views on Treatment of Open and Gunshot Fractures.. 66

PHYSIOLOGY

Histochemistry of Sensory Innervation of Glabrous Skin in Certain Mammals.. 67

RADIATION BIOLOGY

Biological Effects of Neutron Radiation.......................... 68

Effect of Serotonin on Methylation of Chromatin Proteins in Radiation Damage.. 74

HUMAN FACTORS

Use of Electroencephalography and Psychophysiological Methods in Occupational Selection of Operators......................... 75

Personality Studies of Military School Cadets..................... 80

PSYCHIATRY

Systems Analysis as Mandatory Prerequisite for Upgrading Psychiatric Care... 83

Review of A. K. Nyman Book on Nonregressive Schizophrenia......... 84

PSYCHOLOGY

Estimate of Mental Efficiency of Students by Means of EEG......... 85

BIOCHEMISTRY

UDC 576.8:620.193

MICROBIOLOGIC ASPECTS OF METAL CORROSION

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 2, Mar-Apr 81 (manuscript received 21 Jul 80) pp 139-145

[Article by Ye.I. Andreyuk and I.A. Kozlova, Institute of Microbiology and Virology, UkSSR Academy of Sciences]

[Text] Data are presented on the role of microorganisms in the corrosion of metals and metallic structures which are used in different ecological conditions. Mechanisms of anaerobic and aerobic corrosion caused by bacteria in the sulfur cycle are examined.

At the current stage of technological progress, it is difficult to name a branch of industry which does not suffer from corrosive damage of metal structures and equipment. The damages caused by corrosion on the economies of highly developed countries is pheonomenal: based on existing data, damages constitute approximately 10 percent of the national income. For example, in the USA, loss from corrosion is calculated at 80 billion dollars yearly.

The role of biological factors in corrosive destruction of metal equipment used in conditions of underground and water environments is so great that the corrosive activity of microorganisms is equated with their geochemical activity. It has been estimated that yearly loss from microbial corrosion amounts to 25 million dollars in Australia and 5 million dollars in New Zealand (1). Pipelines built in England in heavily argillaceous soils fell into disuse in 50-75 percent of cases because of the activity of sulfate-reducing bacteria (2), and in the petroleum-producing industry, 80 percent of corrosive damage was attributed to this group of bacteria (3). In France, according to statistical data from 1967, loss from biodamage to metals was 2-5 billion francs.

Preliminary studies on microbial damage date back to the end of the last century: to 1891. Garret established that corrosion of metal intensifies in environments where ammonia-forming bacteria multiple actively (4). In 1934, the Dutch investigators Kyur and Flyugt (cited in Booth and Tiller (5)) formulated an hypothesis on the mechanism of anaerobic corrosion of metal caused by sulfate-reducing bacteria. English corrosion experts made an important contribution to understanding this mechanism (5,6). They used the polarization method of Khorvat and Solta (cited in (5)) to study anaerobic bacterial corrosion of iron, steel and aluminum. The American investigator Iverson demonstrated graphically the electrochemical nature of microbial corrosion using his original methodologic approach (7).

Interest in questions concerning microbial corrosion has greatly increased both in our country and abroad. Now, the problem of corrosion and, particularly, of biocorrosion has as much importance as problems of energy, environmental protection, food reserves, etc. The global nature of the processes of microbial corrosion is explained well in the diagram formulated by Miller and Tiller (8) in which all forms of microbial corrosion are presented; that is, those observed in conditions of surface, below-ground and water environments (figure 1).

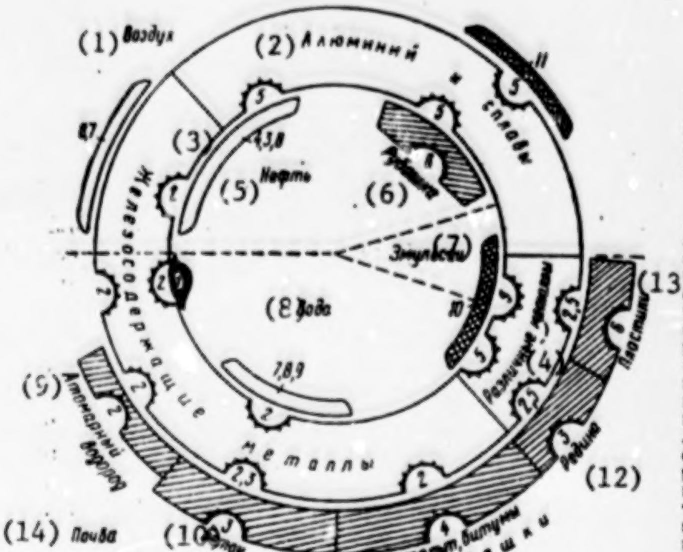


Рис. 1. Схема, иллюстрирующая проявления микробной коррозии металлов и защитных материалов (*Müller, Tiller,* 1971).

1 — наросты (неорганические+железобактерии), вызывающие коррозию путем образования дифференцированно аэрируемых ячеек и создающие условия для сульфатредуцирующих бактерий; *2* — анаэробные сульфатредуцирующие бактерии, способные забирать защитный водородный слой на металле в бескислородной среде, в почве или под водой и вызывающие сульфидную коррозию металла; *3* — сероокисляющие бактерии, образуют сульфаты и свободную серную кислоту, разрушают бетон, атакуют металлы, вызывая коррозию подземных металлических и бетонных сооружений, являются фактором создания кислых шахтных вод; *4* — углеводородокисляющие бактерии, разрушают битумные рубашки, чем облегчают доступ к металлу сульфатредуцирующих бактерий, образуют шламы в емкостях для горючего и создают условия для развития других микроорганизмов, продуцируя органические кислоты; *5* — различные микроорганизмы, образующие органические кислоты как конечные продукты роста и атакующие главным образом цветные металлы и некоторые защитные рубашки; *6* — бактерии и грибы, которые разрушают полимеры (синтетический каучук, полиуретановые рубашки в бензобаках) и играют определенную роль в коррозии; *7* — водоросли, образующие слизи на надаемых влажных поверхностях, а также под водой, оказывая действие, аналогичное слизеобразующим грибам и бактериям; *8* — слизеобразующие грибы и бактерии (некоторые из них продуцируют органические кислоты или углеводороды), создают условия для образования дифференцированно аэрируемых ячеек и для роста сульфатредуцирующих бактерий; *9* — грязь на днищах речных и морских судов, создающая условия для роста сульфатредуцирующих бактерий, вызывает коррозию каменных сооружений; *10* — продукты коррозии, накипь, неорганические частицы и др., создающие условия для образования дифференцированно аэрируемых ячеек; органические остатки, являющиеся источником питания для микроорганизмов; *11* — органические остатки на металлических поверхностях над землей.

Figure 1. Diagram Illustrating the Phenomenon of Microbial Corrosion of Metals and Protective Materials (Miller and Tiller, 1971)

1--scabs (nonorganic + iron-depositing bacteria) which are caused by corrosion by the formation of differentiated aerated units and which create conditions favorable to sulfate-reducing bacteria; 2--anaerobic sulfate-reducing bacteria which are capable of penetrating the protective hydrogen layer of metal in an anoxic environment, in soil or under-water and which cause sulfide corrosion of metal; 3--

sulfur-oxidizing bacteria which form sulfates and free sulfuric acid, destroy concrete, attack metals causing corrosion of underground metal and concrete equipment, and which are factors in the creation of acid well water; 4--hydrocarbonic acid bacteria which destroy bitumenous housings, encouraging easy access of sulfate-reducing bacteria to metal, form sediment in fuel tanks and create conditions for the growth of other microorganisms which produce organic acids; 5--various microorganisms which form organic acids as the final products of growth and attack primarily nonferrous metal and certain protective housings; 6--bacteria and fungi which destroy polymers (synthetic rubber, polyurethane housings in gasoline tanks) and play a central role in the corrosion process; 7--algae which form slime on moist above-ground surfaces and under-water ones causing an effect analogous to slime-forming fungi and bacteria; 8--slime-forming fungi and bacteria (some of them produce organic acids or hydrocarbons) which create conditions for the formation of differentiated aerated scabs and encourage the growth of sulfate-reducing bacteria; 9--sludge on the underside of river and ocean-going vessels which creates conditions for the growth of sulfate-reducing bacteria and which causes corrosion of masonry equipment; 10--products of corrosion, scum, nonorganic particles and others which create the conditions for the formation of differentiated aerated scabs; organic residues which are the food source for microorganisms; 11--organic residues on above-ground metal surfaces.

Key:

1. Air
2. Aluminum and alloys
3. Ferrous metals
4. Various metals
5. Petroleum
6. Housing
7. Emulsion
8. Water
9. Nascent hydrogen
10. Concrete
11. Asphalt, bitumen
12. Burlap
13. Plastic
14. Soil
15. Protective housings

The life activity of microorganisms is connected to the small circle of the sulfur cycle which most affects underground and ocean equipment (figure 2).

Depending on ecological circumstances, corrosion can be anaerobic or aerobic because the agents are sulfate-reducing or thionic bacteria, respectively. Anaerobic corrosion is observed in neutral or weakly alkaline pH in argillaceous or marshy soils and inflicts serious damage on pipelines and different forms of equipment used in the petroleum- and gas-producing industries.

Understanding the mechanisms by which bacteria are drawn into the process of metal corrosion has been made possible by a complex of electrochemical, biochemical, microbiologic and metallographic investigations which together provide the most complete collection of information on the characteristics of the process of microbial corrosion.

Use of potentiostatic methods of investigation in studying the process of bacterial anaerobic corrosion of metals has allowed us to demonstrate that the participation of sulfate-reducing bacteria in the corrosive process leads to cathodic depolarization as seen in the consumption of polarized hydrogen by bacteria and the stimulation of cathodic segments of corroded metal. Use of biochemical methods allowed us to delve into the nature of the process of cathodic depolarization which is determined by the activity of hydrogenase in sulfate-reducing bacteria.

Data were obtained (9) which pointed to the fact that the corrosive activity of sulfate-reducing bacteria corresponds to their hydrogenase activity (figure 3). Thus, in the presence of the Llanelly strain which exhibits high hydrogenase activity, loss in mass of steel equipment was at the maximum level.

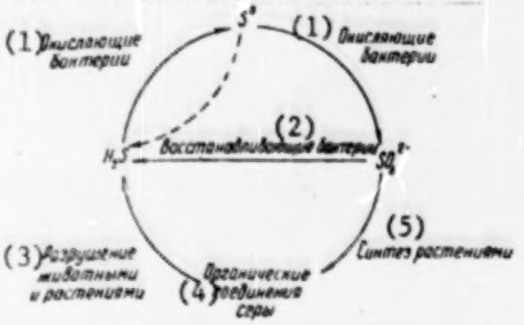

S^0
(1) Окисляющие бактерии
(1) Окисляющие бактерии
(2)
Восстанавливающие бактерии
H_2S
SO_4^{2-}
(5)
Синтез растениями
(3) Разрушение животными и растениями
(4) Органические соединения серы

Рис. 2. Цикл серы в природе (Booth. 1971).

Figure 2. The Sulfur Cycle in Nature (Booth, 1971)

Key:

1. Oxidizing bacteria
2. Reducing bacteria
3. Destruction by animals and plants
4. Organic compounds in the environment
5. Synthesis by plants

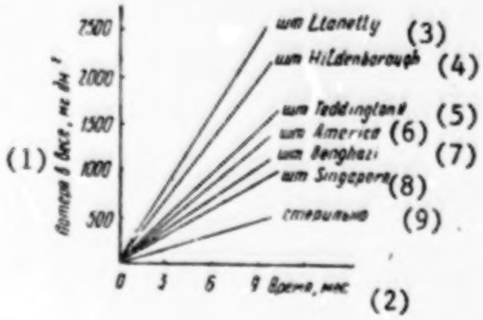


Рис. 3. Потеря в весе стальных образцов под действием штаммов сульфатредуцирующих бактерий с различной гидрогеназной активностью (Booth, Wormwell, 1962).

Figure 3. Loss in Mass of Steel Structures Effected by Strains of Sulfate-Reducing Bacteria with Different Hydrogenase Activity (Booth, Wormwell, 1962)

Key:

1. Loss in mass, mg/dm^{-2}
2. Time, months
3. Llanelly strain
4. Hildenborough strain
5. Teddington strain
6. America strain
7. Benghazi strain
8. Singapore strain
9. Sterile

It is possible that this group of microorganisms participates in other ways in the corrosion process--perhaps they accelerate cathodic depolarization of hard sulfides in iron which are the main by-products of bacterial reduction of sulfates (6). Given a sufficiently high quantity of sulfide in iron in the environment, galvanization of parasulfide in iron occurs--iron emerges primarily as a cathode. According to the data of King and Miller, the acceleration of this cathodic reaction, because of the presence of hard sulfides, depends on the quantity of bivalent iron in the environment (figure 4) (10).

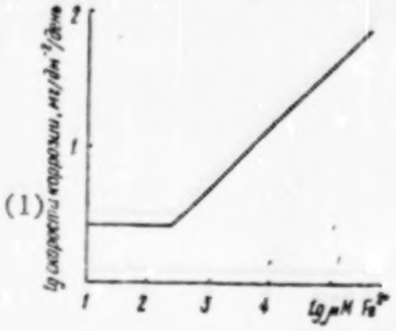


Рис 4. Влияние концентрации закисного железа на скорость коррозии мягкой стали в культуре сульфатредуцирующих бактерий (King, Miller, 1977).

Figure 4. Influence of Concentration of Ferrous Iron on the Rate of Corrosion of Mild Steel in a Culture of Sulfate-Reducing Bacteria (King, Miller, 1977)

Key:
1. lg rate of corrosion, mg/dm^{-2}/day

In natural conditions, depending on the ecological circumstances, one or another mechanism can predominate in the corrosive process. However, the basic factors for anaerobic corrosion of metal and metallic equipment are sulfate-reducing bacteria.

Anaerobic corrosion occurs when there is an adequate quantity of free or dissolved oxygen in the environment. The main agents for this form of corrosion are thionic bacteria and other microorganisms which are products of corrosively active metabolites. Usually, these are mineral or organic acids.

The most potent agents of this form of corrosion are thionic bacteria Thiobacillus ferrooxidans, T. thiooxidans and T. thioparus which are responsible for the formation of acid-aggressive environments (11). They energetically oxidize elementary sulfur, sulfide, thiosulfate, polythionate and sulfites, found in soils and lands, into sulfuric acids. T. ferrooxidans oxidize oxides of ferrous sulfuric acid into ferric which are very aggressive oxidizers of metal structures. Ferric oxide, picking up the electrons from the surface of steel or iron, is reduced to ferrous which, in turn, is oxidized again into ferric by T. ferrooxidans (12). Bacterial oxidation of bivalent iron in an acid environment occurs one hundred thousand times faster than in chemical oxidation (13). Moreover, according to Iverson's hypothesis (14), thionic bacteria can be included directly in the corrosion process, catching electrons with the help of a "trapping" mechanism, accelerating their transposition to corresponding acceptors and, thus enabling intense disturbance of the metal. It is also possible that the activity of thionic bacteria leads to disturbances in the integrity of the passivating scum on the surface of metal. In turn, this leads to differentiation on the surface of cathodic and anodic particles and to the formation of microgalvanic elements.

There are many examples of aerobic corrosion of underground communications equipment caused by thionic bacteria. For example, in one of the regions of London, sections of piepline were destroyed in the course of a year. The cause for this rapid destruction turned out to be thionic bacteria (2). Thionic bacteria caused the creation of a corrosive situation in the construction of the Kiev subway (15). The main determining factor of the highly corrosive activity of these bacteria was the incorrect intervention of man in the ecological system of geologic deposition. Use of the caisson method for channeling the tunnels as an economically profitable one which had been proven effective for other building projects, was shown to be destructive in concrete situations. The intensification of aeration of ground water caused by compressed air led to intensification of microbiologic oxidation of pyrite and marcasite, contained in water and the layers of geologic deposition. In the course of 5 months, as a result of activation of the oxidizing activity of thionic bacteria in the conditions of increased aeration, ground water with a pH of 7.0 was transformed into a 0.1 N solution of sulfuric acid, leading to a precipitous corrosion of boltings.

Determination of the biogenic circumstances required for the initiation of an aggressive environment is important for the preservation of a given structure and for guaranteeing its durability. The results of microbiological investigations can be used to formulate recommendations for selection of methods for channeling of tunnels in potentially aggressive soils.

It is extremely important to predict the course of microbiological processes which occur in tunnel works after the tunnel is put into operation. For this purpose, we studied the relationship of individual thionic bacteria involved in oxidation of an environment to aeration, to sources of energy and conducted prolonged full-scale observations (11,16). A close functional connection was found between the titer of T. ferrooxidans and pH values in geological sediments. We were able to deduce an inferred curve which allowed us to predict changes in pH in the environment in actual conditions in relation to quantity of acidophilic thionic bacteria.

Long-term investigations of the microbiological processes which occur during channeling of tunnels helped us to detect in examined soils the presence of both thionic bacteria and sulfate-reducing bacteria. A change in ecological conditions, in particular an increase in pH and a decrease in OVP [redox potential] altered the ratio of bacterial population among these groups. Natural observations and our experimental data on the relationship of these bacteria to different sources of energy allow us to propose a scheme for the transformation of sulfur in geological paleogenic sediments (figure 5). According to our scheme, it is evident that in certain ecological conditions of geologic sediments containing different compounds of sulfur, the microbial transformation which occurs causes an accumulation of such corrosively dangerous metabolites as sulfides, elementary sulfur, polythionates and others. Study of the corrosive activity of bacteria which transform sulfur in conditions of geologic deposition showed that a number of thionic bacteria (T. ferrooxidans, T. thiooxidans, T. thioparus) accelerate by 1.5-2 times the process of corrosion of mild steel, used widely in underground construction (figure 6). In a culture of T. ferrooxidans, loss in mass of objects made of steel-3 occurs more intensely than in a culture of T. thioparus because of the physiological characteristics of acidophilic and acidophobic representatives of the Thiobacillus genus.

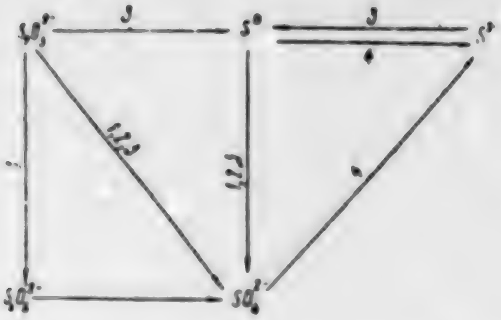


Рис. 5. Гипотетическая схема микробной трансформации серы в палеогеновых отложениях. *1 — T. ferrooxidans; 2 — T. thiooxidans; 3 — T. thioparus;* 4 — сульфатредуцирующие бактерии.

Figure 5. Hypothetical Scheme for Microbial Transformation of Sulfur in Paleogenic Sediments. 1--T. ferrooxidans; 2--T. thiooxidans; 3--T. thioparus; 4--sulfate-reducing bacteria

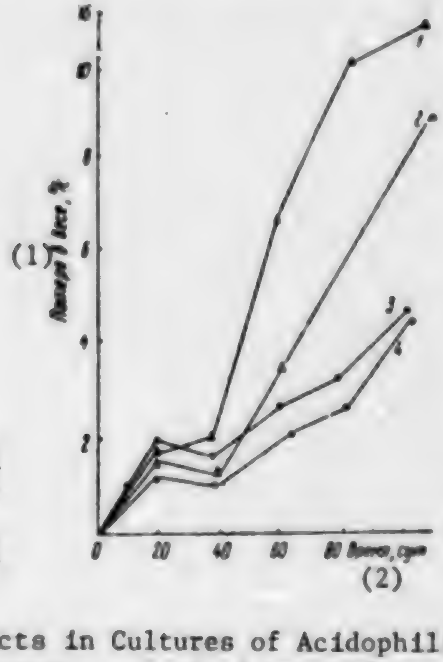


Рис. 6. Потеря в весе стальных образцов в культурах ацидофильных и ацидофобных тионовых бактерий.

1 — T. ferrooxidans; 2 — стерильная среда Летена; *3 — T. thioparus;* 4 — стерильная среда Бейеринка.

Figure 6. Loss in Mass of Steel Objects in Cultures of Acidophilic and Acidophobic Thionic Bacteria. 1--T. ferrooxidans; 2--sterile Leten medium; 3--T. thioparus; 4--sterile Beyyerink medium

Key:

1. Loss in mass, percent
2. Time, days

The decrease in the corrosive potential of the examined forms of steel-3 in a growing culture of T.thioparus suggests an intensification of the process of cathodic depolarization caused by these bacteria (figure 7). Based on the figure, it is clear that in 1-day cultures of T.thioparus, the potential in the cathode zone was reduced to 90 mV in comparison to the sterile control, and in 7-day cultures--to 150 mV. The nature of the depolarizing agent was examined. The character of the corroded surface of steel-3 pointed to the local effect of the above-mentioned bacteria on the metal; that is, it confirmed that there is a mechanism for the creation of electrochemical hetereogeneity.

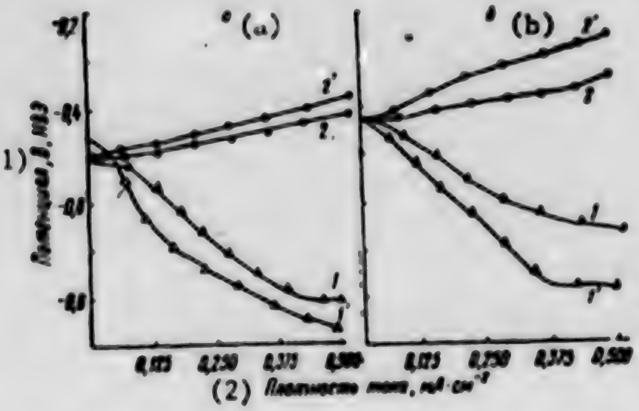


Рис. 7. Поляризационные кривые для малоуглеродистой стали в суточной (*a*) и 7-суточной (*б*) культурах *T. thioparus*. 1 и 2 — *T. thioparus*; 1' и 2' — стерильная среда Бейеринка.

Figure 7. Polarization Curve for Low-Carbon Steels in 1-Day (a) and 7-Day (b) Cultures of T. thioparus. 1 and 2--T. thioparus; 1^1 and 2^1--sterile Beyyerink medium

Key:
1. Potential, V, n.h.e.
2. Current density, $mA \cdot cm^{-2}$

Thus, the role of microorganisms in the corrosion process is ambiguous; the bacteria cause the formation of corrosively active metabolites and participate directly in the electrochemical corrosion process on the surface of metal. Study of the physiology of active cultures, their ecological and corrosive activity assists in carrying out a more indepth evaluation of the role of microorganisms in the corrosion of metal and in developing scientifically-based methods to combat these forms of biodamage.

BIBLIOGRAPHY

1. McDougall, J., "Microbiological aspects of metal corrosion," AUSTRAL. CORROS. ENG., 1969, vol 13, No 11, pp 13-16.

2. Booth, G.H., "Microbiological corrosion," London: Mills and Boon Ltd., 1971, 64 pp.

3. Lichtenstein, S.A., "Bacteria as a cause of corrosion," CORROS. PREVENT. AND CONTR., 1968, vol 15, No 2, pp 21-23.

4. Rogers, T.H., "The promotion and acceleration of metallic corrosion by microorganisms," J. INST. METALS, 1948, vol 75, No 1, pp 19-39.

5. Booth, G.H., Tiller, A.K., "Polarization studies of mild steel in a culture of sulfate-reducing bacteria," TRANS. FARAD. SOC., 1960, vol 56, pp 1689-1697.

6. King, R.A., Miller, J.D.A., "Corrosion by the sulfate-reducing bacteria," NATURE, 1971, vol 233, No 5320, pp 491-492.

7. Iverson, W.P., "Direct evidence for the cathodic depolarization theory of bacterial corrosion," SCIENCE, 1966, vol 151, No 3713, pp 986-988.

8. Miller, J.D.A., Tiller, A.K., "Introductory microbiology," In: "Microbial Aspects of Metallurgy," England: Medical and Technical Publishing Co. Ltd., 1971, pp 1-35.

9. Booth, G.H., Wormwell, F., "Corrosion of mild steel by sulfate-reducing bacteria. Effect of different strains of organisms." In: 1st Congress of Metal Corrosion," London, 1962, p 341.

10. King, R.A., Miller, J.D.A., "Corrosion of ferrous metals by bacterially produced iron sulfides and its control by cathodic protection," ANTI-CORROS. METH. AND MATER., 1977, vol 24, No 8, pp 9-11.

11. Andreyuk, Ye.I., Kozlova, I.A., "Litotrofnyye bakterii i mikrobiologicheskaya korroziya" [Lithotrophic Bacteria and Microbiological Corrosion], Kiev: Nauk. dumka, 1977, 164 pp.

12. Karavayko, G.I., Kuznetsov, S.I., Golomzik, A.I., "Rol' mikroorganizmov v vyshchelachivanii metallov iz rud" [Role of Microorganisms in Extractability of Metals from Ore], Moscow: Nauka, 1972, 247 pp.

13. Landgren, D.Dzh., Vestal, Dzh.R., Tabita, F.R., "Microbiological pollution of mine drainage collectors," In: "Mikrobiologiya zagryaznennykh vod" [Microbiology of Polluted Water], Moscow: Meditsina, 1976, pp 69-87.

14. Iverson, W.P., "Microbiological corrosion," CHEM. ENG., 1968, vol 23, pp 242, 244.

15. Andreyuk, Ye.I., Rubenchik, L.I., Kozlova, I.A., Glushchenko, T.F., "The influence of partial pressure of oxygen in the air and oxidation of the environment on the activity of thionic bacteria," MIKROBIOLOGIYA, 1973, vol 42, No 4, pp 643-646.

16. Kozlova, I.O., Andreyuk, K.I., Tsokur, N.I., Antonovs'ka, N.S., "Microbiological processes in Oligocene strata surrounding metropolitan tunnels after completion of caisson work," MIKROBIOL. ZHURN., 1976, vol 38, No 5, pp 563-570.

COPYRIGHT: Izdatel'stvo "Naukova dumka", "Mikrobiologicheskiy zhurnal", 1981

9139
CSO: 1840/536

ALL-UNION CONFERENCE 'NEW SOURCES OF FOOD PROTEIN AND THEIR APPLICATION'

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 2, Mar-Apr 81 pp 266-267

[Article by L.A. Zakordonets]

[Text] In November, 1980, the All-Union Conference on New Sources of Food Protein took place in Tbilisi. The conference was conducted by the Scientific Council of the USSR Academy of Sciences on the problem of "The Scientific Basis for Producing Artificial Food", the USSR Ministry of Higher Education, the USSR Ministry of Food Production, the GSSR Ministry of Higher Education, the GSSR Ministry for Food Production, the USSR Ministry of Meat and Dairy Production and Tbilisi State University. Representatives of scientific-research institutes, higher educational institutes and establishments of the above-mentioned departments from a number of republics in the Soviet Union took part in the conference.

Reports were presented at the conference on general questions concerning the processing of protein, obtaining protein from animal and plant sources, using protein from new sources derived from meat products, dairy products, bread-making and the canning industry.

The conference was opened by V.M. Belikov (Moscow), director of the Scientific Council of the USSR Academy of Sciences on the problem of "The Scientific Basis for Producing Artificial Food."

G.G. Mikeladze (Specialized Laboratory of Proteins, Amino Acids and Analogs of Food Products, Tbilisi State University) presented a report on "Perspectives on production of products with increased biological value using nontraditional proteins and amino acids." He asserted that, because of current technological progress, urbanization, a sharp rise in the density of population involved in intellectual work, it is important to create products with more biologically active substances and to increase the content in food of protein substances with valuable amino acid content. Nontraditional proteins, extracted from by-products and secondary sources of meat-dairy and food production, from the green parts of plants, must be harmless and easy to digest. Such products require propaganda which will overcome the psychological barriers of the population.

The report of V.B. Tolstoguzov (Institute of Organoelemental Compounds of the USSR Academy of Sciences, Moscow) was concerned with new directions in the production of food--processing of protein in new forms of food. In the time period of 1985-1990, production of new forms of food in industrially developed countries, on the average, will exceed production of conventional food products by 10-25 percent and higher.

Certain data on production of proteins around the world were presented in the report of V.F. Lishchenko (USA and Canada Institute of the USSR Academy of Sciences).

Several reports were concerned with questions on production by microbiological methods of food protein from various by-products of agriculture, of food production and other sources of carbohydrates: "Biomass of single-cell forms as a source of protein for edible purposes" (A.N. Grigoryan et al., Moscow); "Production of mycelium from highly developed fungi and perspectives on its use as a food product" (G.R. Morozova et al., All-Union Scientific-Research Institute of Synthetic Proteins, Moscow); "Cultivation of edible fungi from by-products of agricultural crops" (Klyushkina et al., All-Union Scientific-Research Institute of Biotechniques, Moscow); "Obtaining protein concentrate from the biomass of Sporotrichum pulverilentum and certain physico-chemical characteristics" (G.G. Mikeladze et al., Tbilisi State University and INEOS [Order of Lenin Institute of Organoelemental Compounds] of the USSR Academy of Sciences); "Disintegration of chlorella (algae) cells and extraction of protein for food purposes" (M.V. Kutateladze and G.G. Mikeladze, Tbilisi State University); "Investigation and elaboration of methods to enrich bread with protein products from the yeast biomass" (L.N. Kazai. ıkaya et al., Leningrad Department of the All-Union Scientific-Research Institute of Bread Production); "Study of the amino acid content of proteins obtained from various sources" (L.V. Besprozvannaya, G.G. Mikeladze, Tbilisi State University).

A number of reports were concerned with autolysis of microorganisms and extraction of amino acid compounds from the autolysates as a new way to use by-products of food production to obtain a ration of special food which is well balanced in composition: "Autolysis of yeast as one way to use microbiologic sources of food" (V.M. Belikov et al., INEOS, USSR Academy of Sciences); "Cider and wine residues as sources of carbohydrates for cultivation of yeast protein" (E.G. Sardzhveladze et al., Tbilisi State University and INEOS, USSR Academy of Sciences) and other reports on experimental studies.

A large number of reports were concerned with medico-biological investigations on protein from new sources. Of particular interest were the reports of Ye.A. Venglinskaya et al., (Problem-solving Laboratory of the Kubanskiy Medical Institute, Krasnodar) entitled "Immunocytochemical criteria for evaluation of the relative harmfulness of new biomasses of microbiological synthesis" and "Natural resistance and the problem of food"; V.P. Nelyubin et al. (All-Union Scientific-Research Institute of Veterinary Hospitals, Moscow) "Biological value of nonpeptide sources of protein"; the exhibit-type report of B.L. Rubenchik (Institute of Hygiene of Food, Kiev) "On the modification action of proteins in chemical oncogenesis."

The conference was conducted on a high scientific and organizational level with active discussions on a number of questions.

In resolutions, unanimously adopted in the concluding session, participants in the All-Union Conference noted that the search for new sources of food protein, the creation of new forms of high quality products of food and increase in the food value of existing products are the most pressing problems for the new field of large-scale production of foodstuffs.

In the October (1980) Plenum of the CC CPSU, special attention was focused in the Scheme for Basic Directions on the need to improve the supply of foodstuffs to the population. In light of these tasks, there can be no doubt about the timeliness of this All-Union Conference and the pressing nature of the questions discussed at the meeting.

COPYRIGHT: Izdatel'stvo "Naukova dumka", "Mikrobiologicheskiy zhurnal", 1981

9139
CSO: 1840/536

ECOLOGICAL AND TECHNOLOGICAL PROBLEM OF BIODAMAGES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 2, Mar-Apr 81 pp 267-268

[Article by I.A. Kozlova and E.Z. Koval']

[Text] In Poltava on September 8-10, 1980, the Plenum of the Scientific Council of the USSR Academy of Sciences on Biodamages took place. Participants included leading scientists who discussed different aspects of the problem and who represented institutes and establishments in Moscow, Leningrad, Kiev, Gorki, Baku and other cities in the Soviet Union.

In recent years, studies on biocorrosion have attracted the attention not only of scientists but also of skilled workers, inasmuch as damage caused by biological agents has become all the more perceptible.

The problem of biodamages is the ecological-technical problem of modern times, encompassing a wide circle of questions related to the study of organism-destruction from microorganisms, rodents and birds which cause damage to an enormous number of materials, resources, products and equipment and the need to develop means for protection from bio-overgrowth, biodamage and biocorrosion.

To coordinate investigations on this problem, the Scientific Council affiliated with the Presidium of the USSR Academy of Sciences was created in 1972.

During the 1980 Plenum of the Scientific Council participants examined the proceedings of 7 sections and heard 15 scientific reports on important new directions in research on this global problem.

A review of the scientific-organizational activity of the Scientific Soviet was presented by its chairman, V.D. Il'ichev. He stressed the origin of the ecological-technological approach to solving this problem in our country. The problem of biodamage will always exist and, therefore, it is necessary to approach it from a framework of the system of "biosphere and man." The upcoming tasks for investigators in the field of biodamages are predicting the corrosive process, then inventory, catagorization and classification. Of paramount importance will be an indepth study of the ecosystem of all organisms which participate in biodamages, corrosion and overgrowth.

The problem of biocorrosion also includes protection from it. The report "Chemical agents for protection against biodamages" (in materials from the All-Union Ufa

Conference which took place in July, 1980) was presented by Deputy Director of the Scientific Council B.V. Bocharov. The basic goal of creating agents for chemical protection--asserted the lecturer--is increasing the safety, economy and durability of resources and materials. Special attention was focused on creating highly effective inhibitors of the process of corrosion in the petroleum-extracting and petroleum-refining industries. At the present time, 25 percent of embedded oil deposits are susceptible to sulfate-reducing bacteria and approximately 30 percent of equipment breaks down because of the action of bacteria and fungi.

The chairman of the section on "Microorganisms and the lower plant", corresponding member of the USSR Academy of Sciences M.V. Gorlenko noted the definite successes made in the study of the ecology of microorganisms--agents of destruction in the Ukraine, Lithuania and Armenia. He also focused attention on the need to evaluate losses from biodamage.

Protection of materials and equipment from damage by rodents and insects was reviewed in the report of D.P. Zhuzhikov. Questions of overgrowth and protection from it in fresh water were covered in the report of G.D. Lebedeva, During the session on "Protection of materials and technical apparatus from birds" new data concerning technical and biological aspects of decreasing the danger to airplanes from birds were presented by V.E. Yakobi.

Yu.P. Nyuksha (chairman of the Leningrad Department of the Scientific Council) outlined the studies being conducted at 25 scientific institutes in Leningrad and the Leningrad oblast.

S.N. Gorshin devoted his presentation to scientifically practical aspects of protection of timber from biodamage. He focused particular attention on the training of cadres who work in this area. Analysis of directions in the selection of biocides for protection of materials and equipment from overgrowth was reviewed in the report of A.M. Tsukerman.

A separate session was concerned with discussing results of these studies in the republic.

In the summary report on work of members of the Section for Biocorrosion of the Scientific Council of the UkSSR Academy of Sciences on the Problem of the Physiology of Microorganisms (Chairman Ye.I. Andreyuk, Scientific Secretary I.A. Kozlova), the speaker analyzed the present state of and perspectives for studies on biocorrosion in the UkSSR. In the Ukraine at the present time, 10 institutes connected to the system of the UkSSR Academy of Sciences, the UkSSR Ministry of Higher Institutes of Learning and the UkSSR Ministry of Petroleum Production are working on question of the biocorrosion of metals.

Improvement in the organization of research in the republic after the creation of the Interdepartmental Scientific-Technical Council on Corrosion and Anticorrosive Protection of Metals was noted. Studies on biocorrosion are being conducted in the Ukraine in the following areas: underground biocorrosion; biocorrosion of metals and equipment used in marine and fresh waters and in systems for water supply; biocorrosion of metals in equipment located above ground and above water; biocorrosion of petroleum products, polymer and organosilicon materials and resources. Along with studies on the mechanisms of biocorrosion, recommendations for protection from corrosion are being developed and introduced in production. This aspect of work was stressed in detailed reports of corresponding members of the UkSSR Academy of Sciences V.P. Tul'chinskaya, V.I. Kachan, R.M. Kas'yan and V.I. Dakhnovskiy. The Institute of Microbiology and Virology of the UkSSR Academy of Sciences was represented by corresponding member of the UkSSR Academy of Sciences V.I. Bilay, who with his coauthors, presented the report "The influence of ecological factors on the physiological characteristics of fungi which cause damage to various metals."

Interesting reports were presented by L.A. Vol'f ("The principles for protection of textile materials from biodamage," Leningrad, ITLP [expansion unknown]), Yu.P. Nyuksha and others.

All sessions were conducted in an atmosphere of creative and interesting discussion.

COPYRIGHT: Izdatel'stvo "Naukova dumka", "Mikrobiologicheskiy zhurnal", 1981

9139
CSO: 1840/536

CONFERENCE ON PLANT VIROLOGY

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 2, Mar-Apr 81 pp 269-270

[Article by V.G. Krayev]

[Text] A conference on plant virology took place on September 15-20, 1980 in Blazheyevko near Poznan'.

The conference was organized by the Committee for the Protection of Plants of the Polish Academy of Sciences and the Institute of Plant Protection (Poznan') as a routine national conference of Polish phytovirologists, but unlike previous ones, scientists from other countries participated.

More than 70 scientists took part in the conference including 20 scientists from Hungary, the GDR, Canada, Rumania, Czechoslovakia and the USSR. The Soviet delegation was represented by scientists from Leningrad (VIZR [All-Union Scientific-Research Institute for the Protection of Plants]), Vladivostok (The Biological-Soil Institute of the DVNTs [Far-East Scientific Center] of the USSR Academy of Sciences) and Kiev (IMV [expansion unknown] of the UkSSR Academy of Sciences).

At the conference, 27 scientific reports and 19 experimental reports were presented.

The conference was opened by the director of the Institute of Plant Protection Professor V. Vengorek (PNR [Polish People's Republic]).

In the review report of Professor V.Blazhchak (Poznan', PNR) data were outlined on the basic viral diseases which affect agricultural and ornamental plants in Poland. He noted that viral diseases inflict significant damage on the harvest of potatoes, calculated at millions of tons yearly. However, in Poland an intensive study is being conducted on the viruses affecting potatoes and efforts are being made to identify varieties which are resistant to viral diseases. In recent years, in Poland a significant number of new (for the country) viruses of legume plants and vegetable crops have appeared. Work on detecting and identifying viruses of agricultural plants and studies to produce resistant varieties of various agricultural crops are in progress at the present time.

Professor E. Kurstak (Montreal, Canada) gave an overview of the problem of the influence of viral diseases of plants and animals on the international production of food products. Considering that loss of harvests of food products and decrease in productivity of livestock is very substantial, the author suggested that the application of a system of measures to combat viral diseases is especially advantageous for agricultural countries in Africa, Asia and Latin America. Such measures could have an enormous economic impact, eliminating the need for developing new areas of cultivation in less suitable lands. He also stressed the great danger of the practice of single-crop cultivation in many countries around the world; a practice which causes the accumulation of viruses in these plants, leading to an increase in loss from viral diseases. He noted that there is an especially great loss in crops where antiviral measures are not conducted (countries in Africa and Latin America).

Loss from viral diseases in animals is also extremely great; for example, in the FRG, loss from leucosis in large cattle equals 40 million dollars yearly, loss from foot and mouth disease in Latin America has been estimated at 1.5 billion dollars. International efforts to develop a coordinated system to combat viral diseases are necessary (creation of serum and antigen banks, vaccination programs, quarantine measures, etc.).

A number of reports were related to questions on the interaction of viruses with cells, in particular the degradation of the capsid protein of the alfalfa mosaic virus, by cellular proteases of the plant host (I. Pozdena, M. Chex, CSSR [Czechoslovak Socialist Republic]); ultrastructure of the intracellular network and the structural changes in cells caused by various viruses affecting plants (I. Brchak and O. Kralik, CSSR; A. Zelin'ska, PNR); intracellular localization of synthesis of RNA of the X-virus in pot toes (V. Krayev, O. Kushnirenko, USSR).

Significant attention was directed at methods for diagnosis of viral diseases and comparative evaluation of their effectiveness. Thus, it was shown that electron microscopy is sensitive for detecting the chrysanthemum V virus (S. Krichin'sky et al., PNR). L. Betsner et al. (VNR [Hungarian People's Republic]) reported on results of using various serological tests for identification of a new asymptomatic virus, appearing in Hungary, which is related to the group of komoviruses.

Various modifications of serologic methods for the diagnosis of plant viruses and their strains were reviewed by I. Polak (CSSR), R. Gnutova (USSR), and D. Polak (CSSR). They noted that the highly sensitive ELISA test, used widely for diagnosis of plant viruses, is not always more reliable than standard methods for serological diagnosis and that the effectiveness of this test depends on the type of virus infection.

Several reports were related to the characteristics of new viruses, strains and isolates of plant viruses, isolated in various countries in recent years and their distribution in the seeding of cultured plants. In his report, V. Kanevskiy (PNR) described the detailed characteristics of two new strains of the cucumber mosaic virus. V. Fedorov (PNR) reported on the new appearance in Poland of a virus of early brown-rot of peas in different varieties of broad beans. New plant-reservatories for sugar beet mosaic virus have been found among weeds (T. Grela, PNR) and certain non-characteristic plant-hosts for the yellow mosaic virus of beans were described (B. Mitsin'skiy and M. Pshibyl'ska, PNR). Unusual strains of a virus which causes stunted growth of peanuts were described in the reports of Kh. Pospeshny et al. and A. Tvardovich-Yanush et al. (PNR). Viruses of black circular mottling of tomatoes, circular rotting of raspberries, necrotic curliness of tobacco and cucumber mosaic virus have been detected in ornamental plants (M. Kamin'ska, PNR).

During the conference, questions on the epidemiology of viral diseases of plants and practical measures to combat them were examined. Yu. Vlasov (USSR) presented data on the effectiveness of "vaccination" of tomatoes with weak strains of VTM [tobacco mosaic virus] in conditions of covered soil. V. Reyfman (USSR) reported on the distribution of viral diseases in potatoes in the Far East and the use there of a system of antiviral measures (selection of healthy tubers, vaccination with weakly pathogenic strains of KhVK [expansion unknown] and sanitation of certain varieties by the method of terminal meristem). V. Pasokha (CSSR) reported on practical antiviral measures used in the production of seed potatoes in Czechoslovakia. These measures include organization of closed seed-growing regions, use of insecticides and antiviral weeding using specially designed collectors.

G. Schuster (GDR) confirmed the merit of use of certain classes of synthetic compounds as antiviral preparations--analogs of purine and pyrimidine as well as growth hormone substances, etc.

A number of reports and experimental studies were related to questions on the influence of various climatic and agrotechnical factors on the susceptibility of plants to viral diseases.

Materials presented at the conference showed the significant increase in the number of investigations in the field of phytovirology in the PNR and the increase in their methodologic and scientific level. The participation in the conference of phytovirologists from other countries made it possible to form a picture of the general directions in the development of research in this field in countries of SEV [Council of Economic Mutual Assistance] and to become acquainted with the system of measures used to combat viral diseases affecting agricultural crops.

COPYRIGHT: Izdatel'stvo "Naukova dumka", "Mikrobiologicheskiy zhurnal", 1981

9139
CSO: 1840/536

UDC: 576.8:621.9.079

BACTERIAL BREAKDOWN OF CUTTING FLUIDS AND METHODS OF PREVENTING IT

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81
(manuscript received 21 Dec 79) pp 54-59

KACHAN, V. I., ALPAT'EVA, T. A. and GRIGOR'EVA, G. P., All-Union Scientific Research and Planning-Design Institute for the Oil Refining and Petrochemical Industry, Kiev

[Abstract] The purpose of this work was to study the damage to domestic emulsion cutting fluids by microorganisms, the influence of microorganisms on the primary properties of these fluids and the selection of the most effective methods of protecting the fluids from microbiological damage. Domestic fluids such as Ukrinol-1, Ukrinol-1/1, Ukrinol-211, Akvol-2 and Akvol-6, as well as a number of emulsols widely used in the metal working industry, were studied. It was found that concentrates of the cutting fluids contain practically no microorganisms and can be stored for several years without damage. However, when diluted to 2-12% emulsions, used for metal working, they are rapidly damaged, with bacterial levels reaching $1 \cdot 10^5$-$1 \cdot 10^7$ cells per mℓ within 48-72 hours. The bacteria present in the fluids were the same as those present in the environment. The studies showed that when the number of microorganisms in the fluids exceeds approximately $1 \cdot 10^5$ cells per mℓ, the primary physical and chemical properties of the fluids deteriorate, including change of color, decrease in pH, appearance of traces of corrosion on the metal and decrease in content of emulsol. Damage was particularly intensive with infestation by Desulfovibrios. The authors have developed bacteriocides such as kamcide-1 and kamcide-5, which had good bacteriostatic properties and can be easily produced on an industrial scale. Figures 1; references 17: 9 Russian, 8 Western.
[305-6508]

UDC: 632.954:632.35

INFLUENCE OF HERBICIDES ON SUSCEPTIBILITY OF CABBAGE AND TOMATOES TO BACTERIAL DISEASES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81
(manuscript received 23 Nov 79) pp 64-68

GVOZDYAK, R. I., SIDORENKO, S. S., KULIKOVSKAYA, M. D., ZEN'KOVICH, A. M., GUBANOVA, N. Ya. and AYZENBERG, S. Z., Institute of Microbiology and Virology, Ukrainian Academy of Sciences

[Abstract] A study is presented of the antibacterial activity of a number of herbicides such as trichloroacetate, daktal, semeron, treflan, promethrin, mezaronyl and some of their combinations against the pathogens of slimy and vascular bacteriosis of cabbage and bacterial canker of tomatoes, as well as the influence of the herbicides on the susceptibility of plants to these bacterioses. The study of the antibacterial activity of the herbicides showed that TCA has none. The other herbicides had antibacterial activity at 1:10 and 1:100 dilutions. The most active was treflan. Greater dilutions were not studied. Application of the substances to the soil may influence the immunity of the plants. Treflan and mezaronyl suppressed the growth of X. campestris and C. michiganense at 4-20 μg/mℓ, of E. carotovora at 400 μg/mℓ. Semeron, daktal and promethrin have slight antibacterial activity, trichloroacetate has none. Application of herbicides (trichloroacetate, daktal, semeron, treflan, promethrin, mezaronyl) to the soil increases the susceptibility of head cabbage to slimy and vascular bacterioses, particularly with high humidity and moderate temperature. The susceptibility of the cabbage to slimy bacteriosis depends on the interval between application of the herbicide to the soil and artificial infestation of the plants with bacteria. Application of daktal to the soil slightly increases the susceptibility of tomatoes to bacterial canker. Treflan has no negative effect on the susceptibility of tomatoes to this disease.
[305-6508]

UDC: 576.858.75:578.085.23

'STANDARD' AND 'DEFECTIVE' POPULATIONS OF FLU VIRUS A/Swine/1976/31 AND THEIR ROLE IN FORMATION OF PERSISTENT INFECTION IN CELL CULTURE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81
(manuscript received 11 May 79) pp 93-99

MEDVEDEVA, M. N., ARON, R. A., OSIPOVA, Z. A. and ZHUKOVA, T. Ya.,
All-Union Scientific Research Institute of Influenza, Leningrad

[Abstract] Materials are presented from a comparative study of populations of A/Swine/1976/31 flu virus enriched with either defective or standard particles in terms of a number of parameters, including the capability for formation of persistent infection in a transplanted monkey kidney cell culture, a very inconvenient model for the study of this process. The results of sedimentation analysis showed that both populations of the virus include heterogeneous particles. The population of incomplete virus contained virions with a bouyant density of 1.16 g/cm^3, in addition to the standard and polygenome virions at 1.21 and 1.8 g/cm^3. The sedimentation constant of the 1.16 g/cm^3 virus particles was determined in zonal rate centrifugation in a linear density gradient. The sedimentation constant found was 480 S. Electron microscope photographs of standard and defective populations of virus are presented. Significant differences were found in the nature of the infectious process of the two viral populations. The possibility was demonstrated of development of persistent infection for both virus particle groups. The results produced indicate the significance of DI (defective interfering) particles present in the infectious material in the development and formation of persistent infection under the experimental conditions. Figures 3; references 18: 9 Russian, 9 Western.
[305-6508]

UDC: 576.858.75:578.085.23

CHARACTERISTICS OF VIRUSES SEPARATED IN PERSISTENT INFECTION WITH A/Swine/1976/31 VIRUS IN MONKEY KIDNEY CELL CULTURE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81
(manuscript received 11 May 79) pp 100-104

ARON, R. A., OSIPOVA, Z. A., MEVEDEVA, M. N. and GOLUBEV, D. B.,
All-Union Institute of Influenza, Leningrad

[Abstract] Results are presented from a study of the properties of persistent viruses extracted from monkey kidney cell cultures persistently infected with A/Swine/1976/31 virus. In order to determine the presence of DI particles in populations of persistent viruses, the capability of the viruses for homologous interference with the standard virus A/Swine/1976/31 was tested. Introduction

of a "defective" virus preparation during the first 30 minutes following infestation resulted in inhibition of the reproduction of the standard virus by a factor 10^4 or 99.99%. Persistent viruses (37 and 39) extracted in the stage of development of the persistent infection (24 and 25 days) inhibited reproduction of the standard virus by 91 and 97.8%, whereas the persistent viruses extracted at 90 and 104 days after infection (viruses 44 and 46) had no interfering capability. The thermal sensitivity of neuraminidase of the persistent viruses varied however, this does not indicate a change in the antigen profile of neuraminidase upon persistence. In general, this work presents no new data relating to the problem of changing antigen profile of persistent viruses in comparison with the initial viruses. Figures 1; references 18: 7 Russian, 11 Western.
[305-6508]

UDC: 576.858.23.098

INFLUENCE OF CATIONS ON ELUTION OF ENTEROVIRUSES ADSORBED ON BENTONITE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81
(manuscript received 16 Jul 79) pp 105-109

SHIROBOKOV, V. P., Kiev Medical Institute

[Abstract] A study is presented of the influence of various concentrations of salts of mono- and bivalent cations on the bonding strength of enteroviruses with bentonite. Experiments showed that the bond strength of enteroviruses with bentonite depends essentially on the concentration of salts of bivalent cations in the environment. The experiments showed that monovalent cations (Na^+) do not prevent desorption of the viruses studied from bentonite. Bond strength of enteroviruses with bentonite depends significantly on the concentration of bivalent cations in the salt medium; complete elution of the virus requires decreasing the concentration of the divalent cations to a critical level. The mechanism of action of bivalent cations on adsorption of enteroviruses remains unknown. References 15 Russian.
[305-6508]

UDC: 576.858.77

INFLUENCE OF CONDITIONS AND DURATION OF STORAGE OF DENSONUCLEOSIS VIRUS OF AEDES AEGYPTI ON ITS INFECTIOUS PROPERTIES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81 (manuscript received 24 Oct 79) pp 110-113

LEBEDINETS, N. N. and BUCHATSKIY, L. P., Kiev State University

[Abstract] Results are presented from a study of the influence of conditions and duration of storage on the infectious properties of the Aedes aegypti densonucleosis virus. The study of the infectious strength of Ae. aegypti stored in 50% glycerin at 4°C showed that this method of storage is rather effective. After 18 months storage in 50% glycerin, the infectious strength had changed little in comparison to the freshly extracted virus. The mortality of mosquitoes infected with the virus decreased by only 10-12% after storage. Even after 36 months storage, the mortality of infected mosquitoes was 30.7%. The mortality of mosquitoes infected by the virus stored 1.5 months in water at 21-23°C was 44.6% as opposed to 65.4% for freshly extracted virus. Some activity continues even after 8 months. The virus when stored in dried larvae loses its infective power much more rapidly. Figures 2; references 11: 5 Russian, 6 Western.
[305-6508]

UDC: 576.8.097.29:582.288:578.085.23

DISRUPTION OF MITOTIC STATUS OF Hep-2 CELLS UNDER INFLUENCE OF VARIOUS MYCOTOXINS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81 (manuscript received 29 Dec 79) pp 114-118

NADGORNAYA, N. I., BARSHTEYN, Yu. A. and KURBATSKAYA, Z. A., Kiev Scientific Research Institute of Epidemiology, Microbiology and Parasitology; Institute of Microbiology and Virology, Ukrainian Academy of Sciences

[Abstract] A study is presented of the effect of various mycotoxins on the mitotic conditions of Hep-2 cells. Mycotoxins of various chemical types were studied, with Hep-2 cells from human carcinoma of epithelioid monomorphic type with clear boundaries. The mycotoxins studied at 100 μg/mℓ had varying antibiotic, phytotoxic and dermacidal activities. The mycotoxins fusaric acid, patulin, dendrodoquine, fusarine, fumigatin, helvolic acid and stachibothriotoxin had varying degrees of influence on the mitotic conditions of transplated carcinoma cells Hep-2. Dendrodoquine and helvolic acid greatly suppressed the mitotic activity of the cells. Fusaric acid and patulin caused an increase in pathologic mitoses related to chromosome damage. In cells treated with fusarine

there was an increase in the number of K mitoses. Fumigatin delayed mitosis in the metaphase stage. Figures 1; references 24: 18 Russian, 6 Western. [305-6508]

UDC: 615.31:547

ANTIMICROBIAL ACTIVITY OF N-(4-PHENYL-3-METHYL-2-BUTENYL)-CARBNONOXYMETHYL-PIPERIDINIUM CHLORIDE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81 (manuscript received 13 Jun 79) pp 119-121

PIS'KO, G. T., GUDZ', O. V. and BORISOVA, Ye. V., Kiev

[Abstract] A study is presented of the spectrum of antimicrobial effect of the new title preparation, a surface-active piperidine salt. The study of the antimicrobial activity of the substance by serial dilutions showed that the preparation has broad spectrum antimicrobial activity, with germistatic or germicidal effects depending on concentration. The minimum germicidal concentration was equal to or slightly higher than the germistatic levels. The gram-positive microorganisms such as staphilococcus aureus and certain fungi of the genus Candida are most sensitive. Of the gram-negative microorganisms, B. coli, the Breslau bacillus and Sonne's shigellae are most sensitive. Sensitivity is dependent on pH on a complex manner. References 8 (Russian). [305-6508]

UDC: 576.858.8

SPECIFICS OF STRUCTURE OF COMOVIRUS GENOME

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 1, Jan-Feb 81 (manuscript received 15 Apr 80) pp 124-135

LAPCHIK, L. G. and KUZNETSOVA, L. L., Institute of Microbiology and Virology, Ukrainian Academy of Sciences

[Abstract] This is a literature review article. The group of comoviruses is the most numerous of all known groups of viruses with fragmented separation of genomes. It includes the quail pea mosaic virus, broad bean stain virus, pea green mottle virus, radish mosaic virus and many others. Analytic centrifugation and centrifugation in a saccharose density gradient was used to reveal three components in comovirus preparations, the T, M and B components, which differ only in the content of nucleic acid. Further study of the properties of the capside proteins explained the electrophoretic heterogeneity of purified preparations. The results of the first studies of the biologic significance of heterogeneity of the preparations of various viruses indicated that

only the B component containing the most RNA was infectious. The results of careful separation of nucleoprotein components indicated that the infectious properties resulted from two RNA molecules in different capsides. The fragmented nature of the genome was also confirmed by the results of genetic studies. Genetic analysis indicates that some properties of the comoviruses are determined by the B component, others by the M component and others by both. Analysis of the nucleotide composition of the RNA showed some differences in the content of nucleotides between the M and B RNA. Work has now been begun on a comparative study of the primary structure of the terminal fragments of M and B RNA for the quail pea mosaic virus. No data have been produced which shed light on the principle of posttranslation splitting of the products of translation of RNA in the comovirus. It should be emphasized that replication and functioning of the comcvirus fragmented genome are studied primarily on models of the quail pea mosaic virus. Equally detailed studies on models of other viruses would allow determination of their common regularities and the specifics of each representative of the group. References 129: 7 Russian, 122 Western.
[305-6508]

UDC 579.842.11:579.252.52

COMPATIBILITY OF pAP43 GENETIC TRANSFER FACTOR (F-LIKE FACTOR) WITH PLASMIDS OF F INCOMPATIBILITY GROUP

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 92, No 8, Aug 81 (manuscript received 12 Mar 81) pp 73-75

PEKHOV, A. P., RESHETNIKOVA, V. N., GUBAR', Ye. V. and DROBYSHEVA, N. A.
Chair of Biology and General Genetics, People's Friendship University imeni Patrice Lumumba, Moscow

[Abstract] The genetic transfer factor pAP43 was obtained from a human E. coli isolate; it has been characterized as possessing a molecular mass of 57.7 megadaltons and as an F-like plasmid with Fi^+ features. To further establish its relationship to other F-like plasmids, studies were conducted on its compatibility with plasmids of the seven F incompatibility groups in E. coli, using transposon Tn1. The results showed that pAP43 is compatible with all the reference plasmids and, therefore, appears to be a representative of a new, additional incompatibility group, designated as FVIII. References 5: 2 Russian, 3 Western.
[9-12172]

STUDITSKIY REVIEWS 'RECEPTOR EVOLUTION' BOOK

Moscow ZHURNAL OBSCHEY BIOLOGII in Russian Vol 42, No 1, Jan-Feb 81 pp 156-158

[Review by A. N. Studitskiy of book "Evolyutsiya retseptorov" [The Evolution of Receptors] by Ya. A. Vinnikov, Izdatel'stvo "Nauka", 1979, 139 pages]

[Text] The substantiation of the molecular theory of reception by Ya. A. Vinnikov and the development on this basis of the hypothesis that all receptor cells derive from the flagellar cell, for which the unicellular flagellate organism serves as a universal model, has aroused great interest among specialists in physiology and the morphophysiology of reception both in our country and abroad.

Ya. A. Vinnikov's book, which is the subject of this review, represents the next step in the development of his theory. It contains detailed analysis of the comparative morphology and cytochemistry of receptor cells in representatives of different groups of unicellular and multicellular organisms.

The book includes a short preface ("From the Author"), a short introduction and four chapters, one of which examines the question of the origin of receptor cells. The book ends with a conclusion summarizing the discussion of the concept elaborated in the light of all the facts cited.

Despite its brevity, the introduction is programmed in nature. The concept developed by the author under the designation of the molecular theory of reception consists of the fact that the specific macromolecules of receptive proteins which develop (through phylembryogenesis, the author believes) in receptor cell membranes have the property of entering into interaction with discrete "units of the stimulus of a specific type of internal or external energy." As the result of the interaction of these units the conformation of the receptor macromolecules changes, leading to generation of the receptor potential.

In the chapter "The Origin of Receptor Cells" the author poses and develops the question of how a molecular device that is so astonishing in its universality could develop in the process of evolution. A diagram is given of the hypothesized phylogenesis of the major forms of receptor cells. The source of the development of each of the types of extrareceptor cells known at present can only be the flagellar or ciliary cell, inasmuch as all receptor processes begin with events occuring in an element obligatory for each type--a sensing "antenna" which represents a different form of modified flagellum or cilia. In the center of the diagram is the original model of the receptor device--a unicellular flagellar organism of the type of the flagellate euglena. The author's hypothesis of the development of the first receptor cells during the phylogenesis of multicellular animals by means of specialization in the receptor function by individual flagellar cells when the clone-colony of ancestor flagellar organisms was transformed into a multicellular organism is extremely likely.

The chapter "The Origin of Receptor Cells" contains an in-depth treatment of the question of the sources of origin of the molecular membrane mechanism in the development of organization of living material taken as a whole.

Of great value is the author's treatment of the receptor properties of the membranes (plasmolemmas) of bacterial organisms (Ya. A. Vinnikov numbers them among the Protista, i.e, unicellular eucaryotes, while bacteria, in particular Escherichia coli, which he mentions, belong to the subkingdom of procaryotes), in which, as it turned out, there are receptor proteins.

All of the above prompts concurrence with Ya. V. Vinnikov's general conclusion about the common origin of flagellar, ciliary and receptor cells and on the "antenna" structures of receptor devices. The positive evaluation which he gave Khanstrem's (1928) idea, formulated as an aphorism "The sense organs created the nervous system" (chap 10), is debatable. With the highest evaluation of the role of receptors in the development of the nervous system, comparative morphology forces us to adhere more closely to Sechenov's principle of the determinant role of the motor function of muscles in the evolutionary development of the nervous system. In animals with minimal mobility, such as the first multicellular sponges and Coelenterata, the nervous system is also minimally developed. Progress in the evolution of the nervous system corresponds to progress in the evolution of motor activity.

In the chapter "The Optical Cells", the author presents extensive material from comparative ultramicromorphology of the photoreceptors of unicellular microorganisms and the photoreceptor cells of multicellular animals. The chapter presents excellent diagrams of the ultramicromorphology of the receptor devices of such phylogenetically remote animals as the lamprey and the cricket, in which common molecular membrane mechanisms of photoreception are found. As the author demonstrates, a common molecular-membrane mode of photoreception is performed in different groups of animals, despite divergent differences in the development of the basic organization of photoreception.

Considerable factual material and interesting theories about the evolution of chemoreception are presented in the chapter "Chemoreceptor Cells" where excellent diagrams of the organization of photoreceptor apparatuses in representatives of different taxa are also given and paths of convergent and divergent evolutionary development of chemoreceptor cells are demonstrated.

Study of the biochemical indices of respiratory mucus in certain species confirms the author's concept of a universal molecular-membrane mechanism of reception, including an important conclusion about the generation of membrane potentials during interaction of units of the stimulus with the receptor protein macromolecules in the receptor cell membranes.

A certain perplexity is caused by the author's attempt to explain the differentiation of taste reception by phylogenetic age, according to which in the phylogenetically younger (in Ya. A. Vinnikov's opinion) animals (vertebrates) the specialization of chemoreception is lower than in the phylogenetically more ancient animals--insects. As is well known, however, ancient vertebrates such as the shark inhabited the primeval oceans when there was still no trace of insects (which developed simultaneously with flowering plants). As for sharks and fish in general, chemoreception is exceptionally high in them. If, however, the author meant only the higher vertebrates (mammals), every trainer is familiar with the differential taste sensivity of certain species (for example, dogs).

The chapter "Mechanoreceptor cells" is devoted to the origin and development of the reception of mechanical stimuli to which such an important physiological function as reception of gravitation is due. The author reconstructs the phylogenesis of receptors of mechanical stimulation from flagella of unicellular organisms, whose flagella have the function of locomotion together with the function of orientation in space. With the emergence and evolution of multicelled organisms, the "antenna" signaling location in space was transformed into different "orientational" and "navigational" systems. This chapter presents extensive comparative morphology material, which make it possible to work out a sufficiently clear concept of the different modes of evolutionary transformation of primitive flagellar orienting structures into complex organs of mechanoreception. Excellent diagrams of the structure of different types of mechanoreceptor cells makes it possible to trace with ease the train of the author's reasoning and his argumentation of his general conclusion of the flagellar ("antennal") origin of all receptor cells.

It should be said that the "antennal" theory faces certain difficulties in the field of mechanoreception, or, more broadly, in the organization of reception of "contact." By this is meant the organization of interoceptors, for which "antennal" principles play the same role as for receptors of external stimulation. The reception of pain sensations in the internal organs is based on the function of the organs of pain perception which are far from being completely understood. The orientation in space of the entire body of multicelluar animals is also based on the operation of internal signaling apparatuses, far from the "antennal" pattern. It is well known, for example, that signals of muscle position in the internal space of the body of vertebrates is received from specially organized derivates of cross-striated muscle fibers located within muscle spindles and surrounded by afferent nerve fibers which are wound around them spirally. Similar spiral nervous apparatuses are wound around the tendinous collagenous structures. Still less clear is the "antennal" nature of such capsulated sensory apparatuses as the Vater-Pacini bodies and apparatuses similar to them.

The book is well written. The author may perhaps be reproached for an addiction to foreign word usage. In order to decipher several expressions (for example the word "eskvizitnyy", p 5), the reviewer had to resort to a dictionary. One slip by the author should be noted. By this is meant his reference to data in the literature which pertain to the embryohistogenesis of the taste buds. Supposedly the taste buds are laid down on the seventh day of intrauterine life (citation to Bradley and Mistretta, 1973; Oukli and Chil 1975) and achieve definitive development in man on the 14th day. This is a misunderstanding. The seven-day human embryo is a small clump of cells, surrounded by primitive embryonic membranes, and the 14-day embryo (only a few examples of which have been described in the world literature) has the form of embryonic disks with scarcely discernible somites. The same is true of the estimate of the time of maturity of the taste buds (p 41).

On the whole, the book opens new vistas for research in the field of the morphophysiology of the nervous system. Corroboration of the molecular membrane concept in the physiology of the sense organs sets fundamentally new tasks for hygiene of the sense organs. Deterioration and restoration of the membrane apparatuses of receptor cells makes it necessary to intensify the search for remedies which promote physiological regeneration of membrane apparatuses of receptor cells, primarily the mechanisms incorporating the macromolecules of receptive proteins in the membrane apparatuses.

Ya. A. Vinnikov's book "The Evolution of Receptors" merits the greatest praise.

COPYRIGHT: Izdatel'stvo "Nauka", "Zhurnal obshchey biologii", 1981

9380
CSO: 1840/363

UDC 576.895.4

ECOLOGY OF PREDATORY MITE AMBLYSEIUS SIMILIS KOCH, 1839 (MESOSTIGMATA, PHYTOSEIIDAE) AND ITS POTENTIAL USE IN BIOLOGICAL CONTROL

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 34, No 7, Jul 81 (manuscript received 24 Oct 80) pp 676-681

ARUTYUNYAN, E. S. and DILBARYAN, K. P., Institute of Zoology, Armenian SSR Academy of Sciences

[Abstract] Data are presented on the cultivation and acarophagic activity of the predatory mite Amblyseius similis, and on its potential use in the biological control of the spider mite Tetranychus urticae in Armenia. The results showed that the most favorable conditions for A. similis development are a temperature range of 25-30°C and a relative humidity of 60-90%. Under both open field and greenhouse conditions A. similis was found to be an effective adjunct in the biological control of T. urticae since it is less susceptible to the toxic effects of pesticides employed against T. urticae than the acarophage Phytoseiulus persimilis. The latter had been introduced into Armenia for purposes of biological control but cannot survive Armenia's winter conditions. Figures 3; references 15: 5 Western, 10 Russian.
[8-12172]

UDC 618.981.452-036.2

IMPORTANCE OF TERRESTRIAL PREDATORS IN SPREAD OF PLAGUE ON APSHERON PENINSULA

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 34, No 7, Jul 81 (manuscript received 10 Oct 80) pp 724-729

TALYBOV, A. N. and ISAYEVA, E. V., Azerbaijan Antiplague Station, USSR Ministry of Health

[Abstract] A survey was conducted on the population density of small rodents on the Apsheron Peninsula in the period 1959-1978, the species and population

densities of their fleas and mites, the population densities of their predators (polecats, foxes, etc.), and the infestation of the predators with fleas and mites from the prey. The resultant findings demonstrated that the transfer of fleas from the rodents to the predators was an effective link in the spread of plague, in view of the much wider range of the latter. This was confirmed in the 1976-1978 outbreaks of plague; despite the small size of the red-tailed gerbil population several foci of plague were established due to the spread of infected fleas by foxes that preyed on the gerbils. This poses a threat to humans because of the close proximity of fox lairs to human habitation and their potential contact with domestic animals. References 9 (Russian). [8-12172]

UDC 616.351-006.6-036.2(47+57)

MORBIDITY OF RECTAL CANCER IN MOSCOW

Leningrad VOPROSY ONKOLOGII in Russian Vol 27, No 8, Aug 81
(manuscript received 23 Oct 80) pp 65-68

BRUSILOVSKIY, M. I., GRITSMAN, Yu. Ya., MOSHKOV, K. V., ASTRAKHANKINA, T. A., LIKHOVETSKAYA, L. I. and ZASEYEV, V. K., Moscow Scientific Research Oncological Institute imeni P. A. Herzen, RSFSR Ministry of Health; Moscow Municipal Oncological Prophylactic Dispensary

[Abstract] Epidemiologic studies on the incidence of rectal cancer in Moscow conducted during the 1975-1979 period revealed 5,639 new cases, representing an increase in incidence from 11.9 to 15.7 per 100,000 residents in that period. The corresponding mortality figures increased from 4.6 to 6.1 per 100,000. In the total group of patients women predominated 1.5:1 over men; however, after the age of 70 the male:female ratio was approximately 1:1. Approximately 72% of the subjects were 60 years old or older. Analysis of the therapeutic modalities employed showed that 42.2% of the patients underwent radical resection, 11.5% received palliative treatment, 7.5% received radiotherapy, and 38.9% were treated symptomatically. References 3 (Russian).
[6-12172]

MEDICINE

UDC 616.9-036.2+616.9-084]:001.8

CURRENT BASIC DIRECTIONS OF SCIENTIFIC INVESTIGATIONS ON GENERAL EPIDEMIOLOGY AND PROPHYLAXIS FOR INFECTIOUS DISEASES

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 6, Jun 81 pp 3-7

[Article by I.I. Yelkin, First Moscow Medical Institute imeni Sechenov]

[Text] The 26th CPSU Congress defined the basic directions for economic and social development of the USSR for 1981-85 and for the period up to 1990. This long term program of action relates to all areas of industry, culture and science including epidemiology.

The Soviet state has entered the period of a developing socialist society. In his article "Marxist-Leninism and revolutionary regeneration f the world," published in the journal "Communist" (1977, No 14), M.A. Suslov writes that "the fundamental theoretical work of the CPSU and fraternal parties in other socialist states has allowed the establishment of basic governing principles for construction and realization of the development of socialism. " These governing principles are:
--guarantee of a high degree of industrial strength development using the achievements of the scientific-technical revolution;
--further development of socialist ownership in two basic forms--state and kolhoz-cooperative and their continuing convergence;
--steady growth of public prosperity which is the main goal of socialist common production;
--maintenance, in the course of a long term period, and improvement of the socialist principle for distribution of work as a basic means of distribution;
--progressive changes in the social structure--increase of the managerial role of the working class, strengthening of its union with other layers of workers, strengthening of the unity of all society and its movement towards social homogeneity;
--increase in ideo-political convergence of all nations and peoples of the USSR on the basis of their equal rights and community of communist ideals, and the strong development of their economies and cultures;
--development of the state of dictatorship of the proletariat in a universal socialist government, the deepening and multi-faceted development of socialist democracy;
--further increase in the level of education and culture of the Soviet people, growth of their political consciousness, ideological maturity, formulation of a scientific Marxist-Leninist world view in the broad mass of workers;
--strengthening of a comprehensive collaboration with fraternal socialist states, joining of their external politics in the struggle to ensure the most advantageous

international conditions for construction of socialism and communism;
--increase of the managerial role of the communist and working parties in all areas of public life as a prerequisite for victory of socialism and communism.

The development of these governing principles creates advantageous conditions for accelerating the coordinated harmonious development of all spheres of activity in a socialist society: economic, socio-political and spiritual.

In a society of developing socialism, conditions will be created for successful prophylaxis and elimination of infectious diseases. But the potentials and advantages of socialism are not realized automatically only by virtue of its objective nature. Enormous importance must be attached to subjective factors--increase in activity, discipline, consciousness of the masses; in particular, scientific research work must be of central importance.

In conditions of developing socialism, all forms of association of people are intensive. In recent years, the great density of population has resulted in people mixing together in city transportation systems, during spectator and athletic activities, in public eating establishments, in industry and in other institutions. The majority of children of pre-school age attend day care centers and, without exception, all children of school age attend school. The number of urban dwellers increases from year to year. Thus, if in 1940, 63.1 million people resided in cities or 30 percent of the total populaton of the USSR, then, as of 1 January 1975, this index reached 153.1 million people or 60 percent of the total population of the USSR (TsSU [Central Statistical Administration] of the USSR. National economy of the USSR in 1974. Moscow, Statistika, 1975).

This intense association of people promotes transmission of pathogens and leads to intensification of the epidemic process, factors which must be considered in conducting prophylactic and anti-epidemic measures.

Migration of populations among cities, regions and republics of the country, and also among different countries has a great influence on the rate of the epidemic process. In the USSR in 1940, 1,460.9 million people traveled on all forms of intercity transport and in 1974--4,600.1 million; that is in 1974, every inhabitant of the USSR, including newborns traveled 18 times in the course of a year from his home to visit other populated areas. In addition, it is necessary to consider the high speed of travel. The intense migration of populations is the basic cause of a rapid development of epidemics of certain infectious diseases and their frequent spread from country to country. In 1971, cholera was spread in six countries in Europe, in 1972--in two, 1973--in five, in 1974--in four, in 1975--in five, in 1976--in eight, in 1979--in five countries. In the USSR, for 11 years (1963-1973) more than 2,000 cases of malaria brought in from 64 countries were reported. Based on Weiese's data, of 500 cases of typhoid-paratyphoid, reported yearly in FRG, 20 percent are brought in from the outside (Münch. Med. Woch., 1976, Bd 118, S. 1061-1068). Rische and Ziesche report that in 1973 in GDR foreign tourist travel was responsible for the import of 99 strains of Shigella sonnei and 35 strains of Shigella flexneri (L. fur heyg, 1975, Bd 21, S. 52). Tokarevich points out that in foreign publications, authors noted the possibility of transport by planes used for civil aviation of more than 30 forms of arthropods which are dangerous as transmitters of disease ("Pressing questions in epidemiology and prophylaxis for infectious disases in the northwest RSFSR," Leningrad, 1975, pp 13-21).

Modern agricultural production brought about the need for widespread use of different chemical compounds as fertilizers or for the purpose of destroying agricultural pests. Also, currently, the use of antibiotics has expanded. All this leads to an intense circulation of chemical agents in the biosphere. Many of these compounds are mutagens and, together with ionizing radiation, can cause active variability in the microorganisms which circulate in the biosphere. In addition, all these substances can influence general and specific resistance of people and animals. These facts should also be considered in any scientific investigation in the fields of epidemiology, microbiology and immunology.

In the USSR, much success has been achieved in the battle with infectious diseases. Diseases such as cholera, smallpox, recurring typhus and dracunculosis have been eliminated. There are no cases of plague and, despite the presence of active natural loci, there are only isolated cases of tularemia and malaria. Great success has been achieved in controlling many other diseases. Comparative data on the morbidity of certain infectious diseases are presented in the table (TsSU, USSR. Economy of the USSR in 1979, Moscow, Statistika, 1980).

Morbidity of Certain Infectious Diseases in the USSR
(per 100,000 Population)

Nosologic Form	1913	1940	1979
Typhoid and paratyphoid	266	62	7
Diptheria	314	91	0.1
Whooping cough	314	232	10
Measles	326	605	145

As evidence of the state of our progress in the battle to control infectious diseases, we may use the mortality index for infectious diseases both in the USSR and in other countries--it is still great. According to the far from complete data of WHO, every year around the globe more than a billion people, that is approximately 1/3 of all mankind, become ill with infectious diseases. According to data gathered by WHO, during the seventh pandemic of cholera from 1960-1978, 1,244,042 cases of cholera were reported around the globe. In the report of L.E. Cliff, president of the American Society of Infectious Diseases, in the USA, 20 percent of all patients are those ill with infectious diseases and 80 percent of respiratory diseases are infectious (J. Infect. Diseases, 1974, 129, No 1).

The premises enumerated above should serve as the basis for planning scientific investigations.

Such planning must include as a first priority study of epidemic conditions in the USSR--the structures and dynamics of infectious diseases according to age and months of year, periodicity (cyclic nature) of infectious morbidity.

Certainly, these scientific studies must be coordinated with studies of the governing principles for epidemic processes in modern conditions of a developing socialist society. It is necessary to elucidate the influence of separate factors of modern life in a society (migration of a population, urban planning, public education of children, public welfare of population centers, etc.) on the course of the epidemic process and also the role and significance of scientific technical progress in the battle with infectious diseases.

Two of the fundamental problems enumerated above--epidemic conditions in the USSR and governing principles of the epidemic process in a developing socialist society--can be resolved successfully only by widespread use of an epidemiological geographic method. Epidemiological geography, without doubt, is the scientific basis of prophylaxis for infectious diseases.

It is necessary to study the characteristics of the course of an epidemic process in relation to the geographical environment and the social conditions of life in a society. The elucidation of these characteristics aids in conducting effective measures. Related to the above is the promising study of epidemiological regionalization of the territory in the USSR, the union republics, oblasts and krays. It is well known that the level of morbidity for nosologic forms varies in different territories. It is evident that the general principle of epidemiology is the existence of endemic loci not only for native areas but also for anthroponomic diseases. Time after time, infection to a non-endemic region is spread from these loci. The boundaries of regions with high morbidity do not correspond with administrative boundaries and therefore, comparative analysis of morbidity from infectious diseases, based on average data for an oblast, kray, republic, etc., does not reflect actual conditions. Only detection of regions with high and low morbidity, comparative analysis of governing principles of the epidemic process in regions polarized according to morbidity, can explain the cause of its high level.

Also promising is elaboration of the problem of regional epidemiology or the study of the complexes of infectious diseases in different cities, krays, regions and republics. Each of these territories has an inherent collection of nosologic forms, the diseases which are most disseminated. Identification of the form and elimination of the causes for indigeneity will also serve as the scientific basis for complex plans of prophylactic and anti-epidemic measures.

In our country, a study of how to eliminate infectious diseases has been conceived and carried out successfully. The immediate goal of this plan is a multi-faceted study of how to eliminate morbidity from separate nosologic forms in the territories, regions and republics in the USSR and also on a global scale.

The scientific basis for epidemiological control warrants attention. Above all, this concerns systems for epidemiological operational information. Above all, at present, the information system, used in the struggle with epidemics in the first years of construction of a socialist state, is not suitable; it requires regulation and more efficient methods for epidemiologic analysis. The existing system for calculation and statistics gathering on infectious morbidity is deficient in one main epidemiologic area--operativeness. Retrospective epidemiological analysis interests the epidemiologist for the purposes of evaluating current studies, the effectiveness of certain measures, etc., but the epidemiologist must know how the epidemic process unfolds given one or another current disease process, what changes occur in the governing principles for dissemination of infectious diseases. This information can be culled only with the aid of well organized epidemiological control, based on communication to computers. In Belorussia, Uzbekistan and certain other republics, this type of work is being carried out. It is necessary to develop a system for timely epidemiological inspection using this approach in all union republics and for the Soviet Union as a whole.

In 1971, at the 15th All-Union Congress of Microbiologists, Epidemiologists and Infectious Disease Specialists, the following resolution was voted: "To define in the upcoming years the following basic directions for scientific-investigative activity: a) improvement of the system for collection, transmission and analysis of data on infectious morbidity and measures used to control them by utilization of modern methods of computer technology; b) achievement of an indepth and systematic study of epidemic conditions for the purposes of formulation, on a scientific basis, of a complex plan for prophylactic and anti-epidemic measures and epidemiological prognosis."

In October, 1977, one of the resolutions of the 16th All-Union Congress of Epidemiologists and Microbiologists was that: "...there is an obvious need for the use of accumulated experience of mathematical statistical methods and computers to collect, transmit and analyze epidemiologic information in order to survey the methods for increasing the operativeness of anti-epidemic work, a need for a multi-faceted analysis of epidemic conditions in the USSR and for the development of scientifically based complex plans for prophylactic and anti-epidemic measures and also for epidemic prognosis."

This resolution points to the need for formulation of recommendations for selection of methods for machine tabulation and analysis of materials acceptable for universal introduction in practices of sanitary-epidemiological services at all levels.

Of key importance in the regulation of anti-epidemic control are laboratory studies which aid in diagnosis and elucidation of actual methods for control of the epidemic process in certain conditions. Quick and reliable methods for conducting bacteriological, virological and immunological analyzes are needed.

With the aim of constant improvement in the effectiveness of prophylaxis for infectious diseases, it is necessary to study the epidemiological effectiveness of separate elements of the complex of measures: disinfection at the source, length of hospitalization and prophylactic vaccinations, measures to control carriers, methods to destroy rodents, etc..

Special attention should be focused on the separate socio-economic aspects of the struggle to control infectious diseases: damage to agriculture caused by infectious diseases and the economic significance of prophylaxis for certain nosologic forms.

Although we have already accumulated much experience, indepth studies are still needed on the problem of specific prophylaxis for infectious diseases: the study of immunologic and epidemiologic effectiveness of new preparations and the epidemiological effectiveness of vaccines as a mass measure.

In the study of the governing principles for the epidemiologic process special attention should be directed to the character and cause of seasonal increases and ways to lower morbidity, the periodic (cyclic) variations in morbidity from different nosologic forms and their characteristics, the significance of this problem in finding the most effective prophylactic measures for infectious diseases.

Recently, life in our society has advanced to the first plan. But we are confronted by such problems as: the characteristics of the epidemic process of diseases caused by pathogens and conditionally-pathogenic microorganisms, and factors which determine these characteristics; intrahospital infection in infectious disease, surgical and obstetrical-gynecological hospitals and departments; the nature of the source of infection; the modes of transmission of pathogens; the immunologic structure of the population and its role in the epidemic process; the variability of the etiologic structure of certain infectious diseases (influenza, dysentary, cholera, etc.) and its causes; the variability of pathogenic microorganisms influenced by the increased use of antibiotics, pesticides, chemical therapeutic preparations, vaccines, different physical factors, etc.; and the effect on general and specific resistance of the human organism of physical, chemical and other factors in the biosphere.

These are the general problems of epidemiological science which are the basis for creative developments in institutes and departments.

COPYRIGHT: "Zhurnal mikrobiologii, epidemiologii i immunobiologii", 1981.

9139
CSO: 1840/537

UDC 616.98:579.852.11]-0.7616.15-097.5-078.73

EVALUATION OF ANTI-ANTHRAX IMMUNITY STRENGTH IN EXPERIMENTS ON ANIMALS USING INDIRECT IMMUNOFLUORESCENCE METHOD

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 6, Jun 81 (manuscript received 21 Jan 81) p 108

[Article by P.Ye. Fofanov, I.V. Shchentsev, V.S. Tarumov, M.I. Derbin and V.V. Mikhaylov (deceased)]

[Text] Indirect evaluation of anti-anthrax immunity is made difficult by the absence of reliable and safe tests. Classic serologic reactions for anthrax, utilized in infectious pathology, have been impractical because of their low specificity and sensitivity. In this report, we review the efficacy of tests using immunofluorescent (IF) methods for determination of serum antibody in immunized animals.

As the components for the reaction we used the tested serum, a commercial antiserum corresponding to it and the test culture supplied to us. The latter was discretely arranged, monomorphic cells of vaccine strain of Bac. anthracis STI-1 fixed on a glass slide. For their preparation, we washed a 140-145 minute growth of the microculture from the agar, with cooled distilled water, centrifuged it in a refrigerator centrifuge, filtered it through cambric cloth, diluted it to a concentration of $35 \cdot 10^6$ cells in 1 ml and in a volume of 0.02 ml applied it to the slide. Treatment of the preparations of test-culture, the test and commercial serums, microscopy of the filter and evaluation of the intensity of luminescence were conducted according to standard methods. Studies were accompanied by the necessary controls. The tests were conducted with sera from 242 rabbits and 243 guinea pigs, immunized subcutaneously with different doses of live STI-1 vaccine.

In tests on rabbits, we noted a relationship of serum titer to dose of vaccine. If in rabbits vaccinated with 5 million spores, IF-antibody was apparent only in the whole serum (minimum titer), then in rabbits vaccinated with 12.5 million spores, the average group titer was equal to 1:1.47. Given doses of 100 and 150 million spores, the average group titer increased to 1:2.6 and 1:2.95, but the survival rate of the animals after inoculation with the virus culture was 51.4 and 68.8 percent, respectively. The group titer of IF-antibody in twice vaccinated animals varied from 1:2.13 to 1:4.69. A direct relationship was noted between indices for survival rate and immunofluorescence: in the group of animals with titers for IF-antibody of 1:3.29, we found a protective rate of 71.8 percent, but with titers of 1:4.69, the rate was 92.3 percent. The group indices for the protective properties of sera in all groups of rabbits were lower and were unrelated either to size of vaccine dose or to frequency of vaccination.

Analogous results were obtained in tests on guinea pigs. In the group of animals vaccinated once with 0.5 million spores, the average group titer for IF-antibody was 1:1.91 and the survival rate--33.3 percent; in the group vaccinated with a dose of 100 million spores, antibody was detected in a titer of 1:3.27 and survival rate was 80.7 percent. Similar data were obtained in guinea pigs vaccinated twice. A positive reaction to anthraxin was recorded in 52 animals vaccinated once and in 101 animals vaccinated twice, that is, in 64 and 75 percent, respectively.

The specificity of the IF-method was shown in separate experiments on 70 rabbits and 77 guinea pigs inoculated twice with spores of soil aerobic microbes, closely related to pathogens for anthrax. The resulting quantitites of IF-antibody were detected only in isolated specimens.

With the use of standardized test culture, the sensitivity, specificity and reproducibility of the methods were increased. These data allow us to add the IF-method to some of the reliable tests for indirect evaluation of anti-anthrax immunity and to recommend it for practical investigation.

COPYRIGHT: "Zhurnal mikrobiologii, epidemiologii i immunobiologii", 1981.

9139
CSO: 1840/537

UDC 616.36-002.14--2:578.891]-085.373.6-036.8

EFFECTIVENESS OF PRESEASONAL SEROPROPHYLAXIS FOR HEPATITIS A USING DIFFERENT DOSES OF 10 PERCENT COMMERCIAL IMMUNOGLOBULIN

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7, Jul 81 (manuscript received 29 Dec 80) pp 103-110

[Article by M.A. Gorbunov, A.A. Sumarokov, M.R. Zak, V.B. Yurkuvenas, V.L. Lelikov, I.Yu. Yaroshevskaya, Ye.I. Omel'chenko, A.I. Rinkauskene, S.U. Usmanov, V.I. Klots, Yu.I. Kalantarov, L.V. Minakova, State Scientific-Research Institute for Standardization and Control of Medical Biological Preparations imeni Tarasevich, USSR Ministry of Health; Lithuanian SSR Scientific-Research Institute of Epidemiology, Microbiology and Hygiene, Lithuanian SSR Ministry of Health; Uzbek SSR Republic Sanitary Epidemiologic Station, Oblast and City Sanitary Epidemiologic Station of Andizhan]

[Text] The high level of morbidity from hepatitis virus infection in different territories of our country requires development of new methods and improvement of existing prophylactic measures, used to control these infections. Based on results from numerous investigations, conducted in our country and abroad (6-10, 13), 10 percent immunoglobulin is used at the present time for prevention of hepatitis A in preschool and school-age children. However, these measures, carried out systematically since 1967 in many union republics, in ever increasing volume, has not led to a significant decline in morbidity from hepatitis A. It is no wonder that at the 26th All-Union Congress of Microbiologists and Epidemiologists, scientists underscored the need to formulate scientifically-based recommendations for such questions as the optimum dose of immunoglobulin, the grequency of its administration, the appropriate date for vaccination; that is, recommendations for the improvement of tactics for immunoprophylaxis for hepatitis A (5).

Using the program of the USSR Ministry of Health as a guideline, investigations were conducted during 1978-79 to study the effectiveness of a campaign for immunoprophylaxis using various doses of immunoglobulin. The study was carried out in the territories of the Lithuanian and Uzbek Union Republics, which have different levels of morbidity from hepatitis A.

Materials and Methods

In accordance with a program developed by us for a controlled epidemiological experiment, at the beginning of September, 1978, we administered different doses of immunoglobulin (0.1, 0.75 and 1.5 ml) to 87,319 participants in school grades 1-10 in 3 cities (Klaĭpėda, Šiauliaĭ and Panevėžys) and 8 rayons of Lithuanian SSR. Of the participating students, 29,457 children received 0.1 ml of immunoglobulin, 29,583 received 0.75 ml and 28,279 received 1.5 ml of the preparation. In addition, 28,669 participants, comprising the control group, received 0.5 ml of a sterile nonpyrogenic physiological solution.

In Uzbekistan SSR (Andizhan) 21,059 participants from grades 1 and 6-10 were inoculated (children from grades 2-5 were inoculated with immunoglobulin in May, 1978 and therefore, were not included in the investigation). Immunoglobulin was also given to 9,822 youngsters attending preschool establishments. The school children were inoculated with doses of 0.1 ml (5,579 individuals), 1.0 ml (5,258) and 2.0 ml (4,884); 5,338 school children comprised the control group. Of the preschool children, 3,417 were inoculated with a dose of 1.0 ml, 3,021 with a dose of 2.0 ml; 3,384 youngsters comprised the control group.

All groups involved in the program were assembled according to the principle of group distribution using the method of random selection. The unit of selection for schools was one grade and for preschool establishments in Andizhan--the establishment (nursery, kindergarten, et.).

Observation of inoculated participants was carried out over an 11 month period after inoculation with immunoglobulin (up to August, 1979, inclusively), that is, up to the beginning of the next seasonal rise in the level of morbidity in 1979. Data on the frequency of clinically documented cases of hepatitis A, recorded in the observed cohorts, were correlated and subjected to statistical analysis.

To exclude the possibility of inducing serum hepatitis and to carry out an inoculation campaign in a short time, we administered immunoglobulin by an air gun BI-3 (3)(We extend thanks to members of the specially-created task force from the USSR Ministry of Health, V.Ye. Semenov, V.V. Seroglazov, N.N. Ogarev, I.Ya. Smirnov, V. A. Skrizhevskiy, E.P. Andreychik, P.O. Katsyuk, V.M. Svistunov, G.S. Dunayev, Yu.V. Gurov, V.A. Popov, A.L. Radchenko, V.I. Shedrin, V.A. Plotnikov, Yu.V. Bondarenko, V.A. Perevoznikov, L.Ya. Mogilevskiy, A.F. Golik and V.A. Shikulov who administered the immunoglobulin by air gun method).

In the study, we used 22 series of commercial immunoblobulin, prepared at the Moscow Scientific Research Institute for Vaccines and Sera imeni I.I. Mechnikov, where controls were carried out in the specialized laboratory of the State Scientific-Research Institute for Standardization and Control of Medical Biological Preparations imeni Tarasevich.

Results and Discussion

In table 1, combined data are presented on the estimation of morbidity from hepatitis A in Lithuanian SSR among children who received different doses of immunoglobulin. As is evident from table 1, from October 1, 1978 to August 31, 1979, 662 clinically documented cases of infectious hepatitis were recorded. Thus, in 3 cities and 8 rayons of Lithuanian SSR, the reported cases of the disease were distributed in the following way: 248 among children in the control group, 179 among children who received 0.1 ml of the preparation, 141 among children who received 0.75 ml, and 94 among those who received 1.5 ml of immunoglobulin. The high indices for morbidity for 11 months were 8.8, 6.0, 4.7, and 3.3, respectively (per 1,00 children from each group) (see table 1).

ТАБЛИЦА 1. Эффективность иммуноглобулинопрофилактики различными дозами препарата по 3 городам и 8 районам Литовской ССР за 11 мес наблюдения (с октября 1978 г. по август 1979 г.)

(4) Доза, мл	(1) Литовская ССР (3 города и 8 районов)				(2) Районы с высокой заболеваемостью				(3) Районы с низкой заболеваемостью			
	(5) число заболевших	(6) всего привито	(7) на 1000 привитых (M ± m)	(8) ИЭ	(5) число заболевших	(6) всего привито	(7) на 1000 привитых (M ± m)	(8) ИЭ	(5) число заболевших	(6) всего привито	(7) на 1000 привитых (M ± m)	(8) ИЭ
(9) Контроль	248	28 069	8,8±0,56	—	172	9 786	17,6±1,3	—	76	18 283	4,16±0,48	—
0,10	179	29 457	6,0±0,45	1,5	120	10 139	11,8±1,0	1,5	59	19 318	3,0±0,4	1,4
0,75	141	29 583	4,7±0,42	1,9	85	9 996	8,5±0,9	2,0	56	19 587	2,86±0,38	1,5
1,5	94	28 279	3,3±0,34	2,7	57	9 712	5,9±0,8	3,0	37	18 567	2,0±0,3	2,0
(10) Итого...	662	115 388	—	—	434	39 633	—	—	228	75 755	—	—

Table 1. Effectiveness of Immunoglobulin Prophylaxis Administered in Different Doses in 3 Cities and 8 Rayons of Lithuanian SSR over an 11 Month Period of Observation (from October 1978 to August, 1979)

Key:

1. Lithuanian SSR (3 cities and 8 rayons)
2. Rayons with high morbidity
3. Rayons with low morbidity
4. Dose, ml
5. Number of infected individuals
6. Total number of inoculated individuals
7. Per 1,000 inoculated individuals
8. Index of Effectiveness
9. Control
10. Total

Thus, the most marked effect was obtained with the administration of 1.5 ml of 10 percent immunoglobulin. The index of effectiveness (IE) for use of this dose was 2.7 whereas after administration of a dose of 0.75 ml, the IE was equal to 1.9 and for a dose of 0.1 ml--1.5.

One of the goals of the study was a comparative analysis of the effectiveness of preseasonal immunoglobulin prophylaxis in different territories of Lithuanian SSR with different levels of morbidity from infectious hepatitis. To accomplish this, using indices for morbidity among children receiving placebo, rayons and cities of the republic were divided into two groups. The first group was comprised of territories with indices for morbidity exceeding the average level for the republic and the second group included regions where these indices were lower than the average level for the republic (see table 1). Thus, it became clear that the effectivenss of immunoglobulin prophylaxis in a dose of 0.75 ml and especially in a dose of 1.5 ml was greater in regions with a higher level of morbidity from infectious hepatitis: the IE was 2.0 and 3.0, respectively. In turn, in territories where the level of morbidity was lower than the average level for the republic, given immunization with a dose of 0.75 ml, the IE was 1.5 and with a dose of 1.5 ml--2.0. The effectiveness of seroprophylaxis, given administration of a dose of 0.1 ml in regions both with a high and low level of morbidity, was, for all intents and purposes, the same: the IE did not exceed 1.4-1.5.

Data were correlated on the effectiveness of immunoglobulin prophylaxis in Klaīpėda with the lowest level of morbidity from hepatitis A (3.75 per 1,000 school children in the control group) and in the Kapsukskiy rayon of Lithuanian SSR with a high level of morbidity for hepatitis A (18.0 per 1,000 school children). In the latter, the effectiveness of immunoglobulin prophylaxis increased. Based on these findings, we found that in Klaīpėda, the effect of immunoprophylaxis was noted only among those vaccinated with a dose of 1.5 ml (the IE during 11 months was 1.9). In the Kapsukskiy rayon, seroprophylaxis was effective in participants receiving all the above mentioned doses of the preparation. The IE for a dose of 1.5 ml was 4.6 during this period.

As is evident from table 2, administration of preseasonal immunoglobulin prophylaxis among school children in Andizhan, given the sharp decrease in morbidity from hepatitis A in the city (2.6 per 1,000 school children), was ineffective even with the use of large doses of the preparation (1.0 and 2.0 ml): the indices for morbidity in all groups were the same as in the control.

Consequently, in planning a campaign of immunoglobulin prophylaxis for hepatitis A, it is necessary to consider closely the epidemiologic situation. It is evident that this measure is justified epidemiologically only in territories with high levels of morbidity from hepatitis virus infection. The periodicity of morbidity from hepatitis A should be considered in predicting its occurrence (1).

At the present time, investigators have found that the administration of placental gamma-globulin is accompanied by production of anti-immunoglobulins (11) which points to an antigenic-immunogenic effect of this preparation, one which increases after multiple administrations. With regard to this pheonomenon, it is advisable to study the influence of repeated vaccination with immunoglobulin on the effectiveness of immunoprophylaxis. In rayons of Lithuanian SSR where school children had received previously immunoglobulin on an average of 2-3 times, the effectiveness of immunoglobulin prophylaxis was significantly lower than in rayons where the participants, in

ТАБЛИЦА 2. Заболеваемость гепатитом А школьников и дошкольников Андижана, привитых различными дозами 10% иммуноглобулина

(4) Доза, мл	(1) Школьники							(2) Дошкольники						
	(5) число привитых	(3) заболело гепатитом А с момента прививки						(5) число привитых	(3) заболело гепатитом А с момента прививки					
		(6) в первые 3 мес	(7) на 1000 привитых	(8) ИЭ	(9) за 11 мес	(7) на 1000 привитых	(8) ИЭ		(6) в первые 3 мес	(10) на 1000 привитых (M ± m)	(8) ИЭ	(9) за 11 мес	(10) на 1000 привитых (M ± m)	(8) ИЭ
(11) Контроль	5 338	8	1,5	—	14	2,6	—	3 384	26	7,7±1,5	—	50	14,8±2,7	—
0,1	5 579	6	1,1	—	13	2,3	—	—	—	—	—	—	—	—
1,0	5 258	7	1,3	—	12	2,28	—	3 417	8	2,3±0,8	3,3	28	8,2±1,5	1,7
2,0	4 884	6	1,2	—	11	2,25	—	3 021	12	4,0±1,1	1,9	31	10,3±1,8	1,4
(12) Итого . . .	21 059	27	—	—	50	—	—	9 822	46	—	—	109	—	—

Table 2. Morbidity from Hepatitis A in Andizhan among School and Preschool Children Who Were Inoculated with Different Doses of 10 Percent Immunoglobulin.

Key:

1. School children
2. Preschoolers
3. Ill with hepatitis A after time of inoculation
4. Dose, ml
5. Number inoculated
6. In the first 3 months
7. Per 1,000 inoculated
8. Index of Effectiveness
9. For 11 months
10. Per 1,000 inoculated (M±m)
11. Control
12. Total

ТАБЛИЦА 3. Сравнительная эффективность предсезонной иммуноглобулинопрофилактики гепатита А с помощью различных доз иммуноглобулина за 11 мес наблюдения средишкольников, ранее не получавших и получавших иммуноглобулин

(3) Доза, мл	(1) Иммуноглобулин ранее не получали			(2) Иммуноглобулин получали многократно		
	(4) Число привитых	(5) заболеваемость на 1000 привитых ($M \pm m$)	(6) ИЭ	(4) Число привитых	(5) заболеваемость на 1000 привитых ($M \pm m$)	(6) ИЭ
(7) Контроль	4604	15,9±1,8	—	5182	19,1±1,9	—
0,1	4619	4,8±1,0	3,3	5520	17,8±1,8	1,1
0,75	4758	4,4±0,96	3,6	5238	12,2±1,5	1,7
1,5	4641	3,0±0,8	5,3	5171	8,3±1,26	2,3

Table 3. Comparative Effectiveness of Preseasonal Immunoglobulin Prophylaxis for Hepatitis A Using Different Doses of Immunoglobulin during 11 Months of Observation of Middle School Children Who Had not Previously Received Immunoglobulin and Those Who Had.

Key:

1. Did not receive immunoglobulin previously
2. Received immunoglobulin repeatedly
3. Dose, ml
4. Number of inoculated individuals
5. Morbidity per 1,000 inoculated individuals (M±m)
6. Index of Effectiveness
7. Control

general, had not received immunoglobulin prior to our study (table 3). The level of morbidity from hepatitis A in territories of comparable rayons was practically identical. As is evident from table 3, the effectiveness of seroprophylaxis was clearly seen in regions where school children had never been vaccinated with the preparation. The IE for a dose of 1.5 ml was 5.1. The effectiveness of immunoglobulin prophylaxis among repeatedly vaccinated children was evaluated only in those receiving doses of 1.5 ml, where the IE was only 2.3. As we already noted above, seroprophylaxis for hepatitis A among school children in Andizhan who had received different doses of immunoglobulin was found to be ineffective. However, data from observation of preschool children in this city showed that preseasonal administration of the preparation was effective (see table 2). This is, in our opinion, related both to a higher morbidity among preschoolers (14.8 per 1,000 preschoolers in the group receiving placebo) and to the "immunoglobulin" anamnesis--which varied in frequency of vaccination with the preparation--of the participating schools and preschool children.

Thus, participants from Uzbekistan SSR in the age group of 11-12 years had, prior to our study, already received the preparation 4-5 times (sometimes up to 10-12 times). Preschooler anamnesis showed only about 1-2 vaccinations with it.

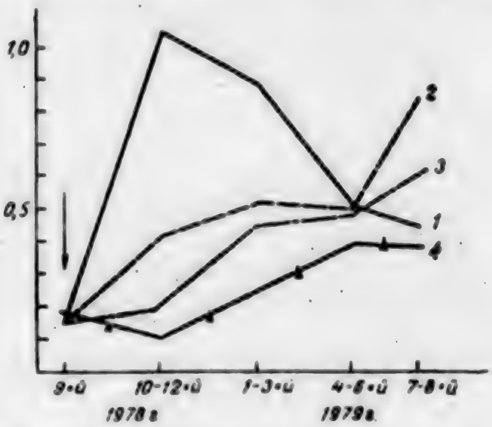
The decrease in effectiveness of immunoglobulin prophylaxis among children who had received previously multiple administrations of the preparation, confirmed the position formulated by Zhdanov and Paktoris (4) that to avoid sensitization and antibody production in response to immunoglobulin, the frequency of vaccination should be limited. Even more inadvisable is the administration of immunoglobulin to children twice in the course of a year. To reduce the frequency of administration, immunoglobulin prophylaxis should be used only among those cohorts most susceptible to hepatitis A infection in one or another territory.

The general practice of widespread use of immunoglobulin has resulted in children in different age groups, in the majority of cases, receiving this preparation three times or more. This situation, excluding the effect of seroprophylaxis, requires re-examination. Thus, it is evident that there is a complete failure in the organization of seroprophylaxis administered to individuals who had received previously multiple placental immunoglobulin vaccinations.

In international practice, the selection of the dose of immunoglobulin is determined by the body weight of the individual being vaccinated. Thus, administration of 0.02-0.12 ml of 16 percent gamma-globulin per 1 kg of body weight in relation to the period of protection required is recommended (12,14).

The results of analysis of data obtained by us attest to the correctness of these recommendations. We found that immunoprophylaxis with a dose of 1.5 ml was effective for all age groups of the participants in Lithuanian SSR, whereas the effectiveness of administration of a dose of 0.1 ml was evaluated only among participants in grades 1-4. The indices for effectiveness of seroprophylaxis with doses or 1.0 and 2.0 ml among preschoolers did not differ statistically (see table 2). It is possible that because of the relative low body weight of preschool children a dose of 2 ml may be excessive.

Results of analysis of morbidity from hepatitis A among vaccinated indivduals in different periods after administration of the preparation are of undoubted interest because they characterize the duration of the protective effect of different doses of immunoglobulin. Scientists have found that the greatest effectiveness of preseasonal immunoglobulin prophylaxis is apparent in the first 3 months after administration of the preparation (see figure). Thus, for the period from October to



Динамика заболеваемости гепатитом А среди детей, привитых различными дозами иммуноглобулина, и в контрольной группе (Литовская ССР).

По оси абсцисс — срок наблюдения по месяцам; по оси ординат — среднемесячная заболеваемость на 1000 детей в каждой группе. 1 — контрольная группа; 2 — группа детей, получивших 0,1 мл иммуноглобулина; 3 — 0,75 мл; 4 — 1,5 мл. Стрелка — введение препарата.

Figure Dynamics of Morbidity from Hepatitis A among Children Vaccinated with Different Doses of Immunoglobulin and Among Individuals in the Control Group (Lithuanian SSR). The axis of the x-coordinate--period of observation in months; the axis of the y-ordinate--average monthly morbidity per 1,000 children in each group. 1--control group; 2--group of children receiving 0.1 ml of immunoglobulin; 3--0.75 ml; 4--1.5 ml. Arrow--administration of preparation.

December, 1978, morbidity among school children who had received 1.5 ml of immunoglobulin was 11 times lower in comparison to those in the control group, 5½ times lower than the morbidity level among children who had received 0.75 ml of the preparation, and 2½ times lower than among those vaccinated with a dose of 0.1 ml. However, in the following 3 months (from January to March, 1979), the indices for morbidity among vaccinated children differed from those in the control group less significantly. The IE for immunoglobulin prophylaxis during this period was only 1.75 for a dose of 0.1 ml, 2.0 for a dose of 0.75 ml and 3.5 for a dose of 1.5 ml. The level of morbidity in March among school children vaccinated with a dose of 0.1 ml was equal to the level of morbidity in the group of individuals who had received placebo. For the period from the 6th to 9th month after administration of immunoglobulin, the level of morbidity in the group of children vaccinated with doses of 0.1 and 0.75 ml was equal to the level recorded for the control group (the difference in quantitative indices was statistically insignificant). After administration of the preparation in a dose of 1.5 ml, the IE was equal to 1.3 during the 6th-9th month. Of interest is the fact that in the period from July to August, 1979, that is, 10-11 months after administration of immunoglobulin, the indices for morbidity among children who had received 0.1 and 0.75 ml of the preparation were statistically significantly higher than those in the control group. In the group of children who were given a dose of 1.5 ml, the indices for morbidity were lower than those for the control throughout the whole period of observation--for practically the whole calender year. Thus, the dynamics for morbidity from hepatitis A among children in the control group were characterized by a steady decline in this index from October to December, 1978, reaching the lowest level in July to August, 1979. These data reflect the natural course of the epidemiological process (see figure). Following the routine autumn-winter increase in the level of morbidity, we observed a decline in the level of morbidity during the summer months.

Different dynamics for morbidity were noted among children who received immunoglobulin primarily in doses of 0.1 and 0.75 ml. The morbidity from hepatitis A in these groups increased steadily and by the 6th month was equal to the level of the control group and then continued to increase. This fact, undoubtedly, deserves further study because the effectiveness noted in the first 3 months after immunoprophylaxis using doses of 0.1 and 0.75 ml subsequently leveled off, as seen in the increase in morbidity indices for these groups.

The preseasonal immunoprophylaxis among preschoolers in Andizhan was effective only in the first 3 months after administration of the preparation (see table 2); in subsequent months, the morbidity for the group of children vaccinated and for the control was almost identical.

We should note that the administration of immunoglobulin in Lithuanian SSR and Uzbekistan SSR was carried out in a very short period of time--in 7-10 days. This, in our opinion, by and large determined the effectiveness of the mass campaign for preseasonal seroprophylaxis for hepatitis A. In fact, because the most marked effect of seroprophylaxis appeared in the first 3 months after administration of the preparation, the period for conducting the campaign must be as short as possible. For all intents and purposes, it is evident that the current practice for conducting preseasonal immunoglobulin prophylaxis over a course of 3 months or more (2) can hardly be effective in influencing the level of morbidity from hepatitis A. Likewise, the practice of conducting mass immunoglobulin prophylaxis in May is unwarranted; that is, during the 3-4 months before the beginning of the seasonal rise in the level of morbidity from hepatitis A infection.

Thus, the results of this investigation allow us to conclude that the effectiveness of immunoglobulin prophylaxis for hepatitis A depends on the frequency of vaccination in the past, the dose of immunoglobulin and finally, the level of morbidity from this infection in the cohorts receiving seroprophylaxis. Thus, the quantitatively determined effect of seroprophylaxis with moderate doses of immunoglobulin appears only in the first 3 months after administration. Recommendations for the universal increase in the extent of seroprophylaxis (more than 90 percent of children in the age group of 1-12 years) using doses as low as 0.1 ml are unwarranted. Moreover, to carrying out similar recommendations based on data concerning the duration of protection provided by the prophylactic measures, children would have to receive the preparation from the moment of birth to 12 years of age for a minimum of 12 times. This is not only unrealistic (yearly vaccination of tens of millions of children), but also unjustified epidemiologically because of data on antigen activity of placental immunoglobulin which induces the formation of anti-globulin antibodies.

Conclusions

1. The effectiveness of preseasonal immunoglobulin prophylaxis for hepatitis A depends on the dose administered. Based on the results of observations conducted in the territories of Lithuanian SSR, the highest prophylactic effectiveness was detected among school children in grades 1-10. These children had been vaccinated with a 1.5 ml dose of immunoglobulin.
2. Immunoglobulin prophylaxis for hepatitis A is an epidemiologically unprofitable measure in territories where indices for morbidity are lower than 3.0-4.0 per 1,000 children.
3. Among children who had received immunoglobulin repeatedly, the effectiveness of preseasonal seroprophylaxis is essentially lower than among children who had not been previously vaccinated with this preparation.
4. The most marked effectiveness of seroprophylaxis for hepatitis A appears in the first 3 months after administration of the preparation. The indices for morbidity among those vaccinated in this period with a dose of 1.5 ml was 11 times lower than in the control. By the 6th month of observation, the indices for morbidity among those vaccinated with doses of 0.1 and 0.75 ml did not differ from those in the control and subsequently (by the 9th-11th months) exceeded them significantly. The index for morbidity from hepatitis A in the course of the entire period of observation (11 months) was lower than the control only among school children who had been vaccinated with 1.5 ml of immunoglobulin.
5. Complex analysis of results of these investigations allows us to recommend a dose of 1.5 ml of 10 percent commercial immunoglobulin as most effective for seroprophylaxis for hepatitis A only in territories with a high level of morbidity and only among those persons with that level of morbidity.

BIBLIOGRAPHY

1. Aleynik, M.D., Krivitskaya, V.S., Ryabikova, T.F. et al., ZH. MIKROBIOL., 1979, No 1, pp 59-63.

2. Aripov, S.A., In: "Voprosy profilaktiki virusnogo gepatita i bakterial'nykh infektsiy"[Questions on the Prophylaxis for Viral Hepatitis and Bacterial Infections], Tashkent, 1980, pp 1-8.

3. Gorbunov, M.A., Sumarokov, A.A., Imamaliyev, O.G. et al., ZH. MIKROBIOL., 1980, No 3, pp 63-68.

4. Zhdanov, D.M., Paktoris, Ye.A., Ibid., 1979, No 1, pp 26-31.

5. Ivanova, L.M., Krivitskaya, V.S., In: "Vsesoyuznyy s"ezd mikrobiologov i epidemiologov. 16th Tezisy dokladov"[All-Union Congress of Microbiologists and Epidemiologists. 16th. Summary of Reports], Moscow, 1977, pp 134-136.

6. Paktoris, Ye.A., In: "Voprosy meditsinskoy virusologii" [Questions on Medical Virology], Moscow, 1964, issue 9, pp 381-392.

7. Paktoris, Ye.A., Kreyek, Kh.Ya., Podsedlovskiy, T.S. et al., Ibid., pp 392-408.

8. Podsedlovskiy, T.S., "Use of gamma-globulin for prophylaxis of infectious hepatitis among school children in Lithuanian SSR," Author's abstract of candidate dissertation, Vilnius, 1965.

9. Spotarenko, S.S., Karon, B.I., Parkhomov, I.I. et al., ZH. MIKROBIOL., 1973, No 10, pp 23-28.

10. Spotarenko, S.S., Ibid., 1978, No 11, pp 124-129.

11. Khrometskaya, T.M., "Normal immunoglobulin in man (gamma-globulin) and its influence on immunoglobulin reactivity of an organism," Author's abstract of candidate dissertation, Moscow, 1977.

12. Center for Disease Control: Hepatitis Surveillance, 1978, Report No 42, pp 27-31.

13. Kohler, P.F., Dubois, R.S., Mervill, D.A. et al., NEW ENGL. J. MED., 1974, vol 291, pp 1378-1380.

14. Report of the WHO Expert Committee on Viral Hepatitis, Geneva, 1977.

COPYRIGHT: "Zhurnal mikrobiologii, epidemiologii i immunobiologii" , 1981

9139
CSO: 1840/539

UDC 615.371:579.852.12].014.41

STABILITY OF BASIC PROPERTIES OF LIVE ANTHRAX VACCINE PREPARED IN LIQUID AND SOLID CULTURE MEDIA

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7, Jul 81 (manuscript received 22 Jan 80) pp 113-114

[Article by I.V. Shentsev, G.P. Shumilov, N.V. Sadovoy, M.I. Derbin and V.V. Mikhaylov, (deceased)]

[Text] The question of how long ST1-1 live anthrax vaccine retains its biological properties when stored after preparation in liquid culture media are reviewed inadequately in the specialized literature. In this report, we present results of a comparative study on the basic biological characteristics of two preparations of ST1-1 vaccine--agar and submerged. We used 6 forms of agar vaccine with periods of storage of from 18 years 4 months to 32 years (2 were in the form of desiccated ampoulized preparations and 4 in the form of aqueous-glycerinized mixtures) and 5 series of desiccated vaccines from submerged preparation, stored for 5 1/2 years. As reference preparations, we used 3 series of commercial vaccines from the Tbilisi Institute of Vaccine and Sera. We stored these vaccines for a period of from 10 months to 3 years. Qualitative evaluation of the preparations was conducted in conformity to the requirements of TU-42.

We found that the biological properties of desiccated vaccine from submerged cultures were not altered essentially after storage for 5 1/2 years (period of observation). In all test series, if the vitality of the spores was greater than 94 percent based on tinctorial properties, then the culture did not differ from the initial preparation. The desiccated agar vaccine--1 stored for 32 years, the other for 18 years 4 months after preparation--retained all the initial biological properties. The vaccine was non-injurious for rabbits and possessed a weakly residual virulence for guinea pigs.

The preparations, stored in the form of aqueous-glycerinized mixtures for periods of 27 years, 25 years 7 months and 20 years 10 months, retained completely their vitality and immunogenic properties. They all possessed a marked residual virulence for guinea pigs and were non-injurious for rabbits. In one series of the glycerinized vaccine, after 26 years and 4 months storage, and with expressed residual virulence, the number of viable spores fell to 10 percent, while immunogenic properties were completely lost.

Thus, the stability of the basic biological properties of live anthrax vaccine depends little on the method for cultivation of the strain-producer and is determined basically by the method used for storage of the preparation. The lyophilized desiccated forms of agar vaccine were stored for 32 years and preparations of submerged cultivation for up to 5 1/2 years (period of observation). Consequently, it is advisable to extend from 2 to 5 1/2 years the period of applicability for STI-vaccine, prepared by the submerged method.

COPYRIGHT: "Zhurnal mikrobiologii, epidemiologii i immunobiologii", 1981

9139
CSO: 1840/539

UDC 616.98:579.843.95]:061.3(47+57+517.3)"1980"

FOURTH SOVIET-MONGOLIAN CONFERENCE OF SPECIALISTS FROM ANTIPLAGUE INSTITUTES

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7, Jul 81 pp 115-116

[Article by Ye.P. Golubinskiy and G.A. Aparin, Irkutsk]

[Text] From September 30 to October 2, 1980 in Kyzyl, the capital of Tuvinskaya ASSR [Autonomous Soviet Socialist Republic], the Fourth Soviet-Mongolian Conference of Specialists from Antiplague Institutes convened to review the problem of natural foci of plague. The conference was organized by the Irkutsk Scientific Research Antiplague Institute of Siberia and the Far East, USSR Ministry of Health, and the Institute for Especially Dangerous Infections of the MNR [Mongolian People's Republic] Ministry of Health. Mongolian specialists, representatives from antiplague institutes and the majority of antiplague centers in the USSR, as well as public health workers from Tuvinskaya ASSR took part in the conference (a total of 173 people). Summaries of the reports were published by the Irkutsk Antiplague Institute.

At the conference, 41 reports were presented and discussed on the following questions: 1) the current state of natural foci of plague in the territories of the USSR and MNR, 2) pressing questions on the theory and practice of antiplague methods and 3) other especially dangerous and natural focal infections.

Participants in the discussions which followed the presentation of reports recognized the need for more energetic adoption of new methods for research on the practices of antiplague epidemiology brigades. The experiments of Mongolian specialists who observed the correlation between indices for hydrothermic coefficient and locations for plague epizooty were evaluated positively. Discussions developed concerning questions on the role of farm activity as a method to sanitize plague foci and the epizootologic evaluation of positive results obtained from using serologic tests to detect fraction I of the plague microbe.

During the discussion of pressing questions in antiplague work much attention was focused on a report concerning the possibility of maintenance of the plague microbe during an interepizootic period, outside of the epizootic chain, rodent-flea-rodent, and the interconnection between virulence of the plague microbe in vivo and the activity of its transport systems given inhibition of certain metabolic systems.

In the discussion following reports related to the study of pathogens of cholera, brucellosis, anthrax and other infections, participants stressed the need for more objective evaluation of the role of the NAG-vibrios in acute intestinal infections. A methodologic technique (use of a pedoscope) for the study of the ecology of the pathogen for anthrax was well received. Reports presented by Mongolian specialists on the dissemination of anthrax and erysipeloid in MNR were acknowledged.

The following recommendations were outlined in the resolutions of the conference:
--to continue the study of the structure of natural foci of plague in the Central Asia region, focusing attention on quantitative and qualitative changes in the system of the carrier-transmitter-pathogen and on the range of the variability of the pathogen, as well, in the carrier, the vector organism and the environment; to encourage investigations on mechanisms for subsistence by the pathogen in the interepizootic period, using artificial and natural individual burrows for such study;
--to develop a system for differentiated epidemiological inspection of natural foci of plague on the basis of their classification;
--to improve the methods for laboratory diagnosis and identification of pathogens of plague, cholera, brucellosis, tularemia and anthrax;
--to develop criteria for long and short-range forecasting of epizootic activity in the natural foci of plague;
--to continue the search for new viruses with systemic or selective effects and to find new biological methods of control the carriers and transmitters while assuring environmental protection;
--to continue the study of other especially dangerous and natural focal diseases in Siberia, the Far East and in MNR, using serologic methods of investigation;
--to continue coordination and cooperation in carrying out scientific-investigative and prophylactic measures and in training cadres from the antiplague institutions of the USSR and MNR, utilizing for this purpose, diversified forms of scientific collaboration in accordance with existing agreements and principles.

COPYRIGHT: "Zhurnal mikrobiologii, epidemiologii i immunobiologii", 1981

9139
CSO: 1840/539

UDC: 356.331:658.386.3

PRESSING PROBLEMS OF ADVANCED TRAINING OF MILITARY MEDICAL PERSONNEL IN MEDICAL CORPS INTERN-TRAINING FACILITIES

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 9, Sep 81 (signed to press 16 Sep 81) pp 11-14

[Article by S. S. Frolov, Lt Col Med Serv]

[Text] The 26th Congress of the Communist Party of the Soviet Union outlined a grand program of building of communism in the 1980's. The enormous creativity of a society under developed socialism is a reliable guarantee that it will be fulfilled. Comrade L. I. Brezhnev observed: "The nation has entered into a new decade with a powerful economic and scientific-technological potential, a multimillion army of trained and dedicated personnel."

Constant scientific supervision by the Communist Party is a guarantee of successful training of cadres. Under the 10th Five-Year Plan, the CC CPSU and USSR Council of Ministers adopted such important decrees as "On Further Development of Higher Schools and Upgrading the Quality of Specialist Training," "Further Refinement of the System of Advanced Training of Administrative Workers and Specialists in the National Economy," and others. Questions of improving the education system were discussed at plenums of the CC CPSU and reflected in decrees of the Party and State concerning various problems of social and economic development.

Military medical educational institutions are working persistently to implement the decisions of the Party and government. Attention is concentrated mainly on formation of Marxist-Leninist world views, practical orientation of instruction of students and cadets, refinement of field training, strengthening the ties between the educational-rearing process and objectives of the military medical service.

Many officers of the medical service, physicians serving in the Soviet Army and Navy and paramedical personnel undergo diverse forms of advanced training in all medical specialties each year through internships. The successful performance of tasks ensuing from the decree of the CC CPSU and USSR Council of Ministers, "Measures for Further Improvement of Public Health" and relevant instructions of the USSR Ministry of Defense depends largely on the quality of training of military medical personnel.

In recent years, internships have made some strides in upgrading educational and methodological work, advancing the professional training of medical personnel. This was largely aided by the conference of administrative personnel of military medical educational establishments and military departments of medical institutes held in 1980. At this conference, there was in-depth and comprehensive analysis of the state of educational and methodological work in internships, the causes of existing flaws were disclosed, specific measures were outlined for further improvement of the educational-training process and increasing the role of internships in upgrading the work of the military medical service.

Analysis of the work of internships and results of tests indicate that, in most cases, training of military medical personnel is on a high enough level, consistent with the current state of military medicine. There has been appreciable improvement of instruction methods. Broader use is being made of active teaching methods (TSO [expansion unknown], solving situational problems, etc.). The steps taken to strenghten the ties with the military medical service and higher military medical educational institutions have had a beneficial effect on the quality of professional training of specialists. The best results in training military medical personnel were achieved by the GSVG [Group of Soviet Troops in Germany?], LVO [Leningrad Military District], MVO [Moscow Military District] and other medical corps intern-training facilities.

Nevertheless, the knowledge, abilities and skills gained by specialists through internship training do not yet fully meet the demands of the troops. There is still an unjustified rift between level of training in the same specialties in different medical corps intern-training facilities. There are some common flaws in the work of millitary district and naval intern-training facilities. In some of them, full advantage is not being taken of their capabilities. Several of these intern-training facilities do not have a full work load. At the same time, some officers of the medical service are not undergoing specialization and advanced training within the scheduled time.

The situation is not good in all places with regard to advanced training of medical service unit [chast'] heads. Yet this level of the medical corps largely determines the quality of medical care of the troops in peacetime and wartime. As a rule, they do not undergo special-purpose advanced training when they are assigned and during the period they serve.

The method of cyclic training has not yet become the chief one in the educational process. At the same time, it is known that training in cycles provides maximum opportunities for comprehensive advancement of military, military medical and professional knowledge and practical skills in trainees.

There are flaws in organization of teaching and methodological work at many intern-training facilities. In some cases, an unjustifiably large number of civilian ["private"] instructors are called upon to teach different disciplines, exceeding significantly the needs of the educational process. As a result, the classes are not on a high enough methodological level, and the class supervisors are sometimes poorly trained themselves in the subjects that are taught. The chief medical specialists, administrative personnel of the medical service of the district or navy must be more actively involved in organizing and conducting classes.

In some cases, the educational and methodological documentation does not conform to existing requirements. It does not reflect the important changes that are occurring in the medical service and Armed Forces as a whole. The requirements in instructions concerning improvement of the work of the forces component of the medical service are not taken into consideration in some of the classes. The class schedules are made up formally in a number of cases. Thus, theoretical classes are scheduled in the mornings, when the most intensive therapeutic work is in progress in the hospital departments.

Clinical training merits special attention. As before, questions of diagnostic work in medical centers and medical-sanitary batallions are not being studied sufficiently. Practical training in functional and laboratory methods is not always of a good quality. During classes in hospital departments, the students are not involved in independent work. Educational material dealing with clinical disciplines is often elaborated without consideration of the nature of morbidity, natural and climate conditions inherent in a particular district or fleet. Not enough use is being made of emergency care duty to refine and secure practical skills of physicians. There is often no business contact between medical corps training facilities and public health agencies in outlying areas; advantage is not taken of the vast opportunities of civilian therapeutic and preventive institutions, or medical institute clinics.

It must be noted that, in a number of cases, full use is still not being made of instructor-methodological, demonstration and trial [test] classes to advance the methodological skill of instructors at intern-training facilities. Unfortunately, the positive knowhow in such work present in higher military medical educational establishments is not properly applied in medical corps intern-training facilities. Sometimes, there are irregular meetings of internship councils, they seldom discuss methodological data and civilian instructors do not report on their work.

Well-organized feedback from the troops plays an important role in upgrading educational and methodological work. However, not all that could be has yet been done. In some cases, the fate of officers who have undergone training is not known in the internship. Experience has shown that some of them do not have the opportunity to make practical use of the knowledge they have acquired.

Proper attention to development and improvement of the educational-material base of internship facilities is not given in all places. In some of these facilities, the standard equipment for field training does not meet the requirements and there is not always enough educational literature. Modern technological teaching equipment is being slowly introduced into the education process. Proper conditions have not been provided in a number of hostels to accommodate students.

The military medical service is faced with a major task, that of further improvement of the quality of training of military medical personnel. Medical corps intern-training facilities can and must contribute much toward this end.

Improvement of specialization and advanced training is an extremely important factor. The need for advanced training must be determined on the basis of the actual personal records of postdiploma training of military medical personnel. The chief medical specialists of the district or navy must participate more actively in this work. It is their direct duty to be concerned about the level of training of physicians in their specialty. The importance of this work is related to the fact that, starting in the 1981-1982 school year, usually officers who have completed internships will be enrolled for academic courses at the Military Medical Academy imeni S. M. Kirov and Military Medical Faculty of the Central Institute for Advanced Training of Physicians [TsIUV].

Manning the staff of internship facilities and fulfilment of the curriculum of military medical personnel must be constantly monitored by the administrators of the medical service of branches of the Armed Forces, districts, groups of forces and navies.

One can assess the efficacy and ultimate results of medical corps internship facilities, like the performance of all military medical educational institutions, on the basis of the practical performance of graduates. In this regard, improvement of quality of instruction is a first and foremost task for internship training groups under the 11th Five-Year Plan. To perform it, there must be implementation of an extensive program dealing with all aspects of the educational and training process.

A revision of curriculums and syllabuses is scheduled as an important task in the next few years. Elaboration thereof with due consideration of qualification characteristics will make it possible to change the teaching system to a successive-special purpose footing, with distinct definition of the objectives of each discipline studied and each stage of training, as well as to outline the optimum means of implementation. There is much work in store. The staff of professors and instructors of the Military Medical Academy imeni S. M. Kirov, Military Medical Faculty for Advanced Training of Physicians at the TsIUV and military medical faculties of medical institutes must participate most actively and effectively in this work.

Special attention must be given to professional and practical orientation of specialist training, especially in clinical disciplines. A thorough study should be made of the methods used at many medical VUZ's of combined ["complex"] delivery of lectures and practical classes. Classes in a hospital must be so set up as to have each student constantly observe 5-6 patients with different types of pathology. In the course of training, the students must solve real clinical problems of practical value. The forms of the seminars may vary, rather than be purely theoretical; we refer to analysis of complicated clinical cases, conversations on specific topics with references to case histories and demonstration of specific patients.

Serious studies of polyclinic work plays a rather important role in practical training. Classes must be held in permanent, well-equipped polyclinics, where it is possible to make a thorough and in-depth study of organization of dispensary care, work on problems of early detection and treatment of the diseases that are encountered the most often in the troops. Learning methods of emergency medical care in a hospital, polyclinic and medical center is one of the basic elements of comprehensive practical training at internship facilities. For this reason, broader use must be made of the advantages of therapeutic and preventive institutions of civilian public health.

Experience has shown that good training of qualified specialists can be provided only by instructors with great methodological skill. Consequently, the professional growth of each instructor must be the subject of constant concern on the part of the commanding officers of internship facilities, hospitals and medical service chiefs. The commanding officers of district (navy) hospitals and other medical institutions, which are educational internship bases, must devote more attention to providing the necessary conditions for training and planned classes. The chief medical specialists must offer constant assistance to the internship instructors. However, no matter how well an instructor is trained in his field, he has considerable difficulties in organizing and pursuing methodological work. He could be greatly helped by the departmental staffs of higher military medical educational establishments, particularly with respect to developing methodological material dealing with the most complicated topics, preparing the necessary educational aids for internship students. The initiative of the Military Medical Faculty for Advanced Training of Physicians at TsIUV merits approval. Visiting study cycles are organized for a number of medical corps internship facilities. Unquestionably, the participation of experienced instructors on the faculty in the educational process will be an excellent training ground for pedagogic skill for the entire teaching staff of internship facilities.

At the same time, it would be wrong to believe that the above exhausts the opportunities for improving the quality of training military medical personnel in medical corps internship facilities. The staff of such facilities can also do much in this respect. First of all, we refer to their constant business contact with the medical service of the forces, which we have already mentioned. It would be desirable to set up regular feedback about the work of the graduates, to receive information about difficulties they experience in their work in order to make prompt corrections in the training process. Polling students, which could reveal rather reliably the weak points in the work of an educational establishment, could be of inestimable benefit.

The closest attention should be given to regular instructor-methodological, demonstration and test classes; they should be prepared thoroughly, drawing upon experienced instructors and specialists to participate in this work. Instructors must report on the results of their work at meetings of the internship board to increase their responsibility for the job entrusted to them. Positive knowhow must be the legacy of the entire teaching staff.

A significant advance must be made in strengthening the educational-material base of internship facilities. For this reason, it is necessary to make an in-depth analysis of the state of the material-technical base, define specific plans for updating classrooms and achieve the most effective use of available opportunities. This should be viewed as one of the most important objectives referable to education and training.

There are guidelines [instructive documents] that define the directions of further development of the entire system of education. Success therein depends primarily on proper organization. A basic analysis must be made of what has been accomplished, and the means must be found to overcome flaws and unsolved problems. All of the efforts of the staffs of medical corp internship facilities must be concentrated on good training of qualified specialists capable of performing the difficult tasks of medical support of the troops, in accordance with the increased requirements.

COPYRIGHT: "Voyenno-meditsinskiy zhurnal", 1981.

10,657
CSO: 1840/1

UDC: 616-001.4-001.29-085-036.8

EFFICACY OF SOME METHODS OF CONTROLLING INCORPORATION OF RADIONUCLIDES IN WOUNDS

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 9, Sep 81 (signed to press 16 Sep 81) pp 20-23

[Article by L. A. Il'in, academician of the USSR Academy of Medical Sciences, A. T. Ivannikov, doctor of biological sciences, B. A. Popov, candidate of medical sciences, and I. M. Parfenova]

[Text] At the present time, an active search is in progress for effective means of removing radionuclides from the body. Our objective here was to test the effect of specific sorbents and temporary restriction of blood efflux on resorption of ^{131}I, ^{137}Cs and ^{89}Sr from wounds. At the same time, we checked the extent to which stable iodine preparations could prevent accretion of radioactive iodine in the thyroid after it has penetrated into a wound.

Experiments were conducted on white rats weighing 170-250 g, with 4-6 animals in each group. Experiments were conducted with three types of wounds: punctures, myoepithelial cuts and abrasions. After shaving the coxosacral region, we made dermomuscular wounds (2×0.5 cm) with a safety razor and produced abrasions (1×1 cm) with a fine metal grater. In the latter case, the epidermis and partially the papillary dermal layer were injured. Puncture wounds were simulated by hypodermic injection of radionuclides in the lateral aspect of the hind leg.

In the experiments, we used adsobar to bind ^{89}Sr, ferrocin for ^{137}Cs and AN-52 ion-exchange resin to bind ^{131}I. The latter product limited resorption of ^{131}I from the digestive tract to a significant degree in preliminary tests. The sorbents were applied to the wound surface in a dosage of 25-50 mg 1 or 5 min after contamination by radionuclides. After 1 h, the sorbent was washed off with three wet sponges used successively, after which the wound surface was blotted with a dry sponge.

We compared the efficacy of the sorbents to the effect of moist sponges (removal with water) and nonspecific sorbent--magnesium silicate (talcum). In deactivation of abrasions contaminated with ^{89}Sr, we tested the effects of dry cotton and gauze sponges, the sorbent vokatsit (highly purified cellulose in the form of 5% solution with pH 7-7.2) and 5% CaNa--N, N, N', N' tetracetic acid 2,2'-diaminodiethyl ether (DEETA) solution, a complexone that demonstrated moderate efficacy in eliminating strontium.

We observed the process of absorption of ^{137}Cs and ^{131}I from puncture wounds after applying a tourniquet for 30 min above the crurometatarsal joint 1 or 5 min after applying the radionuclides. Braided rubber 1 mm in diameter served as the tourniquet.

Effect of adsobar on resorption and elimination of ^{89}Sr from wounds (24-h data)

Trauma	Sorbents	Time of treatment after applying ^{89}Sr,min	Percentage of applied amount		Levels in bones, % of	
			removed[1]	remaining	applied amt.	control
Abrasion	Control	--	--	75.5±3.7	28.2±2.7	100
	Adsobar	1	--	93.5±2.7	8.4±1.3	29.8
	Talcum	1	--	76.8±2.1	29.2±1.5	103.5
	Adsobar	1	71.9±2	16±1.3	9.4±1	33.3
	Adsobar	5	69.8±3.9	20.8±1.9	16.4±1.7	58.2
	Control[2]	--	--	78±2.3	23.6±2.3	100
	Adsobar[2]	1	83.3±0.3	11.1±0.8	4.8±0.4	20.3
Dermomuscular wound	Control	--	--	60.9±6.4	53.7±10	100
	Adsobar	1	64.9±3	11.4±1.3	18±2.4	33.5
	Adsobar	5	67.1±4.9	11.8±1.9	17.7±3.9	33
	Control[2]	--	--	77±2.9	15.1±1.9	100
	Adsobar[2]	1	65.4±6.5	18.3±2.7	4.4±1.7	29.1

[1] The wound was washed 1 h after producing trauma.

[2] The animals in these groups were sacrificed after 1 h.

To test the efficacy of stable iodine on radioiodine from the wound, we gave 5 mg potassium iodide by mouth to each rat 5 or 30 min after applying ^{131}I to the wound; when contaminating an abrasion with ^{131}I, its surface was swabbed with 5% alcohol solution of iodine.

We used ^{89}Sr (pH 2), ^{137}Cs (pH 7) chlorides and sodium iodide (pH 7) in the experiments. We determined the extent of absorption of radionuclides and efficacy of these measures by means of direct radiometry of the wounds and measurement of radionuclide content of organs. We used special plastic jars that enabled us to immobilize the rats reliably and to take in vivo measurements of radionuclide levels in the wounds. We assessed the activity of ^{89}Sr, ^{137}Cs and ^{131}I in the wounds by measuring the level of beta radiation with an SBT-13 counter and PP-15 conversion unit. We determined gamma radiation of ^{131}I from the thyroid with a scintillation counter with NaI(Tl) 30×20 mm crystal, collimator in a lead shield and PP9-2M converter.

As shown by the experiments, the use of specific sorbents limited absorption of radionuclides from the surfaces of wounds and abrasions. Treatment of the latter with sorbents 1 min after applying the radionuclides arrested virtually entirely their resorption from the wound surface. Use of talcum under the same conditions diminished resorption of radionuclides only partially (see Table, Figures 1 and 2).

The different degrees of absorption of radionuclides from the surface of abrasions with the use of specific sorbents and talcum are confirmed by the findings with regard to strontium, cesium and iodine levels in rat organs. As can be seen in the Table, Figures 1 and 2, the levels of radioisotopes in the organs of animals with abrasions treated with specific sorbents were 3-3.7 times lower than in rats whose abrasions were dusted with talcum. Analogous findings were made on animals with dermomuscular wounds. Thus, use of sorbents 1 min after contaminating the wounds with radionuclides reduced accumulation thereof in rat organs by 3-4.4 times, as compared to the control.

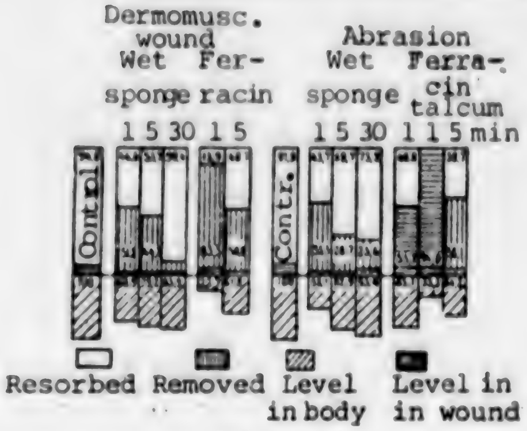


Figure 1.
Effects of sorbents and wet sponges on resorption of ^{137}Cs from trauma

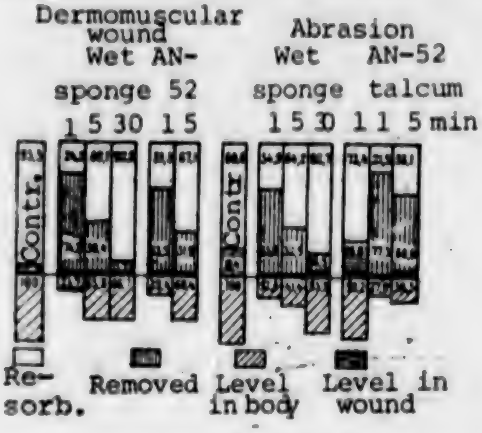


Figure 2.
Effects of sorbents and wet sponges on resorption of ^{131}I from trauma

Use of specific sorbents after 1 min made it possible to bind the radionuclide, and 1 h after application thereof to remove with water up to 65-80% of the ^{131}I, ^{137}Cs and ^{89}Sr. When the wounds and abrasions were treated with sorbents 5 min after application of radionuclide, there were more limited absorption from the wound and accretion in the body. The diminished efficacy of sorbents in such a short time (1-5 min) can be attributed to the intensive resorption of radionuclides through the wound surface, primarily cesium and iodine.

A comparison of the effect of wet sponges (washing off with water) and ferrocin revealed that the latter was more effective, particularly when used 1 min after contaminating the injuries with ^{137}Cs. Thus, the use of ferrocin made it possible to remove 1.6 and 1.7 times more ^{137}Cs from the surfaces of wounds and abrasions and to reduce deposition thereof in the body by 3 and 1.6 times, respectively, as compared to the effect of wet sponges (Figure 1). Use of AN-52 ion exchange resin to absorb iodine from the injuries failed to demonstrate appreciable advantages over treatment with water (Figure 2). This could be attributed to the insufficiently firm binding of iodine by the ion exchange resin.

Figures 1 and 2 show that deactivation is not very effective 30 min after contamination with radioactive cesium and iodine, since up to 80-90% of the radionuclide has time to be absorbed from the surface of wounds and abrasions in this time.

With regard to treatment of abrasions contaminated with ^{89}Sr, the optimum effect was obtained with the use of vokatsit and DEETA (Figure 3). According to our data, use of vokatsit after 4 min removes up to 68% of the strontium; thereafter it diminishes deposition thereof in the skeleton by 40%.

Use of a tourniquet above the injection site 1 min after application of radionuclides prevented absorption from the subcutaneous site. After 30 min, there were virtually no demonstrable radionuclides in blood. The level of ^{131}I in the thyroid did not exceed 0.1% of the applied amount, and it was 90 times lower than in the control group of animals. The levels of ^{137}Cs in muscle tissue, bones, liver and kidneys of rats to whom a tourniquet was applied constituted 0.6% of the applied amount and was 60 times lower than in control animals. When the tourniquet was applied 5 min after injection of radionuclide, ^{137}Cs and ^{131}I levels in rat organs dropped to one-half the control levels.

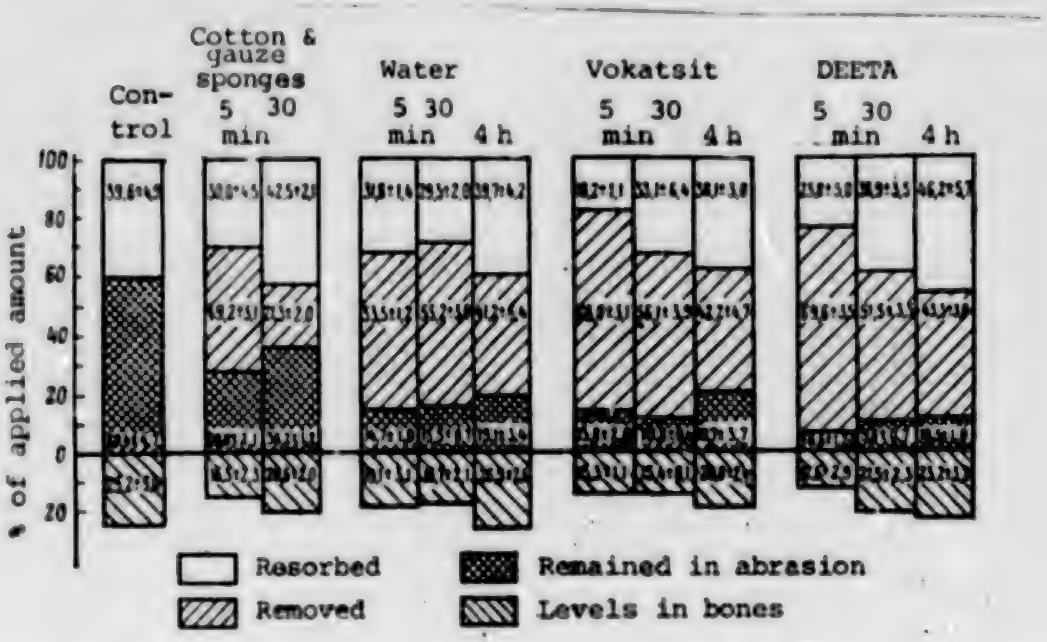


Figure 3. Effects of some agents on deactivation of abrasions contaminated with ^{89}Sr

Thus, in the case of deep wounds, when it is difficult to reach the radionuclide and removal with deactivating agents or sorbents is impossible, a tourniquet is an effective means of limiting absorption of radionuclides that are well-resorbed from wounds.

Testing of the effects of stable iodine preparations on migration of ^{131}I from wounds revealed that there was a drastic decrease in accretion of ^{131}I in the animal's thyroid after intake of potassium iodide by mouth, and the level thereof after 24 h constituted only 0.8-1.6% of the amount of radionuclide applied to the wound or abrasion. By this time, the control animals presented raioactive iodine levels in the thyroid constituting 46-48% of the applied amount. The ^{131}I level in the thyroid 24 h after giving potassium iodide constituted 1.7-3.5%, as compared to the control. We failed to demonstrate differences in accretion of ^{131}I in the thyroid when potassium iodide was given at an early (after 5 min) and later (after 30 min) time. This warrants recommending potassium iodide by mouth within the first 30 min after contamination of wounds with radioiodine. Swabbing abrasions with 5% alcohol solution of iodine was found to be just as effective in lowering accretion of ^{131}I in the thyroid.

Conclusions

1. It was demonstrated experimentally that specific sorbents and a tourniquet are highly effective in limiting resorption of readily resorbed radionuclides from wounds. Use of sorbents 1 min after contamination of dermomuscular cuts and abrasions bound and removed 65-80% of the applied ^{137}Cs, ^{131}I and ^{89}Sr.

2. Use of sorbents or a tourniquet at a later time diminishes significantly their effect of limiting absorption of radionuclides from wounds, and the greater the intensity of their resorption, the more significant this decline.

3. When wounds are contaminated with radioactive iodine, intake of potassium iodide by mouth or treatment of trauma with 5% alcohol solution of iodine within the first 30 min after wound contamination diminishes accretion of radioactive iodine in the thyroid by 50-100 times.

COPYRIGHT: "Voyenno-meditsinskiy zhurnal", 1981.

10,657
CSO: 1840/1

UDC 616-001.5-089"312"

CURRENT VIEWS ON TREATMENT OF OPEN AND GUNSHOT FRACTURES

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 127, No 8, Aug 81 (manuscript received 25 Dec 80) pp 114-116

APANASENKO, B. G. and GRINEV, M. V., Leningrad

[Abstract] A brief review of the literature is provided of the current attitudes toward treatment of open and gunshot fractures. A substantial number of Soviet surgeons is of the opinion that such wounds may be closed immediately after surgical intervention, taking care to provide for extensive debridement, drainage, local infiltration with antibiotics, close follow-up, etc. The view of most Western surgeons is that the wound should remain open in view of the extensive damage done by gunfire and closed several days later if warranted by the clinical picture. The authors share the latter view as a more rational approach in controlling infectious complications, since an open wound must be maintained to assure drainage of the necrotic tissues which cannot be removed by the surgeons because of the unique features of gunshot wounds. References 27: 10 Russian, 17 Western.

[3-12172]

PHYSIOLOGY

UDC 591.8.05-591.87-591.483

HISTOCHEMISTRY OF SENSORY INNERVATION OF GLABROUS SKIN IN CERTAIN MAMMALS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 5, Sep-Oct 81 (manuscript received 9 Jun 80) pp 709-720

SOKOLOV, V. Ye., SHABADASH, S. A. and ZELIKINA, T. I., Institute of Evolutionary Morphology and Animal Ecology, USSR Academy of Sciences, Moscow

[Abstract] Comparative studies were conducted on the histochemistry of the sensory innervation of the plantar footpads of the albino rat, Mongolian gerbil, Central Asian golden hamster, squirrel, chipmunk, and the cat. The results showed that the dermal neural network consisted of both cholinergic and adrenergic fibers, with the latter predominating. Cholinergic nerves showed high non-specific cholinesterase activity and less pronounced acetylcholinesterase activity. The Malphigian layer was permeated with adrenergic, nonmyelinated nerves with high monoamine oxidase levels and a few thin cholinergic fibers. Furthermore, the basal layers of the epidermis in the squirrel and the chipmunk are unique in showing high concentrations of cholinesterase, which apparently serves to reinforce and enhance tactile sensitivity of the plantar pads in these animals. Immobilization and chemical sympathectomy lead to disappearance of acetylcholinesterase and markedly reduce staining for non-specific cholinesterase and monoamine oxidase. Figures 2; references 49: 2 Russian, 47 Western.
[4-12172]

RADIATION BIOLOGY

UDC: 615.849.12.015.4+616-001.28-092]:
612.014.482.4(048.8)

BIOLOGICAL EFFECTS OF NEUTRON RADIATION

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 9, Sep 81 (signed to press 16 Sep 81) pp 72-74

[Article by V. G. Vladimirov, Maj Gen Med Serv, doctor of medical sciences, and A. Ye. Yegorov, Capt Med Serv]

[Text] In spite of the protests of the world community, the aggressive circles of the United States are continuing to work on development and refinement of neutron weapons. Concurrently, studies are being pursued in the United States and some NATO countries of the biological and deleterious effects of neutrons. Research is being pursued in the following directions: deleterious effects of neutrons differing in energy on molecular structures, biological membranes and cells; evaluation of relative biological effectiveness of neutron radiation, as compared to gamma radiation (in this case, both cell cultures and tissues, as well as different species of animals are used as the object of investigation); determination of the distinctions of distribution of absorbed neutron dose in large animals and effect of this factor on the course of acute radiation sickness.

In their analysis and evaluation of the biological effects of neutrons, foreign authors consider the fact that, unlike gamma and x-rays, the flux of neutrons constitutes corpuscular radiation consisting of neutral particles with a mass of 1.009. Because of the lack of electric charge, neutrons cannot directly ionize atoms of the biological substrate and, for this reason, are not stopped by their electron shells. All of the energy of neutral particles is spent on nuclear interactions. This is associated with change in trajectory of neutron movement, the energy is redistributed among it and conditionally static ambient atom.

A distinction is made between three main forms of interaction between neutrons and atomic nuclei: radiation capture of the neutron by the nucleus, elastic and inelastic collision. The prevailing form depends on neutron energy and chemical composition of the irradiated substance.

Neutrons are arbitrarily divided into several groups: slow or thermal (with less than 0.5 eV energy), intermediate (0.5 eV to 10 KeV), fast (10 KeV to 10 MeV) and ultrafast or relativistic (energy of more than 10 MeV) (Brestrap, Wycoff, 1962). Intermediate energy neutrons are classified by some authors in the range of 0.2 eV to 1 KeV (Hine, Brownell, 1958) or even 0.5 eV to 0.5 MeV (Price, 1960).

Radiation capture is the most probable form of interaction between slow neutrons and atomic nuclei. The energy that the neutron transmits to an atomic nucleus is then discharged in the form of gamma quantum. This reaction is also called capture with radiation. Reactions of elastic collision are more typical of neutrons with intermediate energy. It can be considered that, in this case, there is interaction between neutrons and atomic nuclei analogous to collision of elastic spheres.

Fast and ultrafast neutrons can experience inelastic collions with nuclei. A bombarding neutron transmits part of its energy to the atomic nucleus and thereby changes it to an excited state. When the nucleus returns to a normal state the energy of excitation is emitted in the form of gamma radiation. Neutrons with more than 10 MeV energy are capable, upon colliding with a nucleus, of driving protons and neutrons out of it, or even destroying it.

This classification is arbitrary to a significant extent, since neutrons lose their kinetic energy as a result of collisions with atomic nuclei, and subsequent forms of interaction are different. Moreover, it must be borne in mind that there are various elements in cells of the organism, and the form of interaction of neutrons, even of the same energy level, with atoms of these elements will also differ.

In 1954, Zirkel introduced the concept of linear energy transfer (LET). It refers to the amount of energy that a particle or photon loses as it passes through 1 micron of irradiated substance. Since neutrons have no electric charge, their LET will depend only on the rate of movement (energy), and it will be an inversely proportionate correlation, since there is a greater probability that a neutron with less velocity will be submitted to the influence of the forces of nuclear interaction. Nevertheless, the LET of even fast and ultrafast neutrons is rather high, which means that there is more marked damage to biological molecules than with gamma and x-radiation.

The deleterious effect of neutrons is usually compared to the effect of "standard" radiation, in the capacity of which gamma rays are used. This parameter is expressed in units of relative biological effectiveness (RBE): RBE = D_γ/D_n, where D_γ and D_n are equally effective doses (in rads) for gamma and neutron radiation, respectively.

The RBE of neutron radiation is related to the radiation dosage and type of irradiated tissue. For example, according to different authors, RBE of fast neutrons is 1.5-2 for mouse and rat bone marrow (Bond, 1964; Davids, 1967; Duncan et al., 1969) and 3-3.8 for cells and tissues of the gastrointestinal tract (Bond, Easterday, 1959; Hornsey, Field, 1974). Higher neutron RBE levels were obtained in cells of other types of tissues also.

RBE of neutrons is determined by their energy, in addition to radiation dose and type of cells: with increase in energy LET decreases and, accordingly, so does RBE (Table 1). However, high-energy neutrons have a more deleterious effect than gamma rays (Table 2).

It is stressed that, unlike the deleterious effect of gamma rays, the lesion to the biological substrate from neutron radiation reaches a critical level, even under anaerobic conditions. The deleterious effect of oxidative radicals, which are formed in considerable amounts when tissues are oxygenated (so-called oxygen effect), actually cannot contribute anything to the overall lesion and enhance the effect of radiation (Gragg et al., 1974; Suzuki, 1976; Rini, Hall, Marino, 1979). For this reason, the efficacy of radioprotective agents that have a hypoxic mechanism is quite low against neutron radiation. For example, when mice are exposed to neutrons (14.7 MeV energy) the dose reduction factor of p-aminopropiophenone is only 1.09 (Langendorff, 1973).

Table 1.
RBE of neutrons as a function of their energy according to criterion of reduction of testicular weight in irradiated mice (Batchelor et al., 1964)

Neutron energy, MeV	RBE
0.7	4.64
3	2.95
14	2.21

Table 2.
RBE of ultrahigh-energy neutrons according to criterion of reproductive capacity of human kidney cell cultures (Todd et al., 1978)

Neutron energy, MeV	RBE
16	2.96
22	2.6
30	2.28

More marked damage to biological molecules than with exposure to gamma or x-rays is the direct consequence of high RBE of neutrons. Exposure to neutrons elicits a larger number of double-stranded breaks in DNA molecules (Kampf et la., 1977), which are virtually never repaired (Geraci et al., 1977; Field, Hornsey, 1977).

It is reported that this leads to drastic depression of DNA biosynthesis, particularly in radiosensitive tissues--the spleen, thymus, bone marrow, intestinal mucosa and testes. The most profound changes occur in the structure of the nuclear system (chromatin, nuclear membranes and nucleolus) of bone marrow cells, crypts of the small intestinal mucosa and germinative epithelium (Ainsworth et al., 1976; Pecrot et al., 1976; Geraci et al., 1976; Berry et al., 1977; Birkenmayer et al., 1977; Zywietz et al., 1979).

According to the data of Schmitt et al. (1977), RNA metabolism is a less radiosensitive process than DNA metabolism under the influence of both neutron and gamma radiation. When exposed to neutrons, there is more marked change in activity of the enzymatic system of the pentose cycle and Krebs' cycle (Kivy-Rosenberg, 1969), as compared to x-rays, and this is the cause of substantial changes in cellular bioenergetics and electrolyte balance (Suzuki, 1978).

Foreign researchers indicate that the neutron dosage changes significantly as a function of depth of absorption in large animals and man. For example, in a dog, the dosage of gamma-neutron radiation at a depth of 5 cm constitutes about 50-55% of the dosage on the body surface, and at a depth of 10 cm it does not exceed 30% (Wingate, Pade, Ainsworth, 1967). These changes even depend on the size of the neutron beam. According to the estimates of Tait (1950), the superficial absorbed dose is 20-30% higher with a wide beam than a narrow one. At certain depths, there is accumulation of thermal neutrons in biological objects under the influence of fast neutrons, as a result of energy expenditure, and these thermal neutrons emit gamma quanta as they interact with atomic nuclei.

The same systems are critical in formation of acute radiation sickness in animals exposed to neutrons as with the use of gamma rays: hemopoietic tissues and the gastrointestinal tract, and in the case of large doses the central nervous system. There are no appreciable differences in the lesions. However, neutrons have a much stronger deleterious effect on these tissues, and this is distinctly demonstrable in experiments on small animals. In them, the factor of nonuniformity of delivery of neutrons is insignificant, because of their low body weight (Willhoit, Jones, 1970).

In the opinion of foreign authors, the cells and tissues of the gastrointestinal tract are particularly sensitive to neutrons. In this case, as we have already noted, the RBE could almost reach 4. For this reason, small animals usually die of lesions to the gastrointestinal tract when exposed to neutron radiation. The marked damage caused by neutrons to the intestine is attributed, in the first place, to the distinctions of elementary composition of the intestinal epithelium, the cells of which contain more hydrogen than bone marrow tissue does and, in the second place, the significant role of processes of postradiation repair of the intestinal mucosa, which is stricken particularly severely by neutrons (Elkind, 1969). Change in metabolism of mucopolysaccharides, which are the main substance of connective tissue of the mucosa, plays a rather important role. Morphological studies of the gastrointestinal tract stress the fact that extensive necrosis of the mucosal epithelium develops within the first days after exposure to neutron radiation (Kingma-ter Haar, 1978).

At the same time, it is reported that the hemopoietic system is stricken more severely by neutron radiation than gamma or x-rays. The hematological signs of acute radiation sickness developing as a result of accidental exposure of people in the reactor in Vincha (Yugoslavia) are used to confirm this. Six people were exposed to gamma-neutron radiation in a dosage of 300 to 1200 rem (the doses were determined retrospectively on the basis of ^{24}Na activity in blood).

On the 14th day, the victims presented virtually complete aplasia of bone marrow. Pancytopenia and severe impairment of blood coagulation developed in the 4th-6th weeks. There was intensive build-up of lymphopenia and reticulocytopenia, which appeared on the first days of illness. At the height of acute radiation sickness, there was distinct demonstration of anisocytosis, poikilocytosis of erythrocytes, hypersegmentation of granulocyte nuclei, vacuolization and toxic granulation; there were metamyelocytes, lymphocytes with bilobular nuclei and azurophilic granulation.

One of the victims (exposed to about 1000-1200 rem) expired on the 32d day. In the others, the parameters were restored within 1-1.5 years; however, their general condition did not entirely revert to normal, even after 10 years (Szirmai, 1975).

Thus, in the opinion of foreign specialists, neutrons cause more severe damage to biological molecules and structural disturbances in the cellular genetic system than gamma radiation. Among the radiosensitive tissues, hemopoietic tissue and particularly the intestinal mucosa are affected the most. During exposure, neutrons have a nonuniform effect on the organism, and for this reason local radiation lesions are not uncommon.

BIBLIOGRAPHY

1. Brestrap, K. B., and Wycoff, G. O., "Textbook of Radiation Protection," Moscow, Gosmedizdat, 1962.

2. Price, V., "Recording Nuclear Radiation," Moscow, Foreign Literature Publishing House, 1960.

3. Hine, G., and Brownell, G., "Radiation Dosimetry," Moscow, Foreign Literature Publishing House, 1958.

4. Ainsworth, E. J., et al., RADIAT. RES., 1976, 67.

5. Batchelor, A. L., et al., "Proceedings of Symposium 'Biological Effects of Neutrons and Proton Irradiations,' 7-11 October 1963," Upton, New York Intern. Atomic Energy Agency, Publ. Vienna, 1964.

6. Bond, V. P., Ibid.

7. Bond, V. P., and Easterday, O. D., RADIAT. RES., 10, 1959.

8. Birkenmayer, E., et al., BLUT, 1977, 35.

9. Berry, R. J., et al., AMER. J. ROENTGENOL., 1977, 129.

10. Davids, J. A., INT. J. RAD. BIOL., 1967, 13.

11. Duncan, W., et al., INT. J. BIOL., 1969, 15.

12. Elkind, M. M., in "Symposium of Neutrons in Radiology," Oak Ridge, Tenn., 11-14 November 1969, 404.

13. Field, S. B., and Hornsey, S., BRIT. J. RADIOL., 1977, 50.

14. Geraci, J. P., et al., RADIAT. RES., 1976, 67.

15. Idem, Ibid, 1977, 71.

16. Gragg, R. L., et al., Ibid, 1974, 59.

17. Hornsey, S., and Field, S. B., EUROP. J. CANCER, 1974, 10.

18. Kampf, G., et al., STUD. BIOPHYS., 1977, 62.

19. Kingma-ter Haar, J. M., et al., INT. J. RADIAT. BIOL., 1978, 34.

20. Kivy-Rosenberg, E., RADIAT. RES., 1969, 40.

21. Langendorff, H., et al., ATOMKERNENERGIE, 1971, 18.

22. Pecrot, M., et al., C. R. SOC. BIOL., 1976, 170.

23. Rini, E. J., et al., RADIAT. RES., 1979, 78.

24. Schmitt, G., et al., Ibid, 1977, 70.

25. Suzuki, S., Ibid, 1976, 17.

26. Idem, INT. J. RADIAT. BIOL., 1978, 34.

27. Szirmai, E. J., INST. NUCL. ENG., 1975, 16.

28. Tait, J. H., BRIT. J. RADIOL., 1950, 23.

29. Todd, P., et al., INT. J. RADIAT. ONCOL. BIOL., PHYS., 1978, 4.

30. Willhoit, D. G. and Jones, F. G., RADIAT. RES., 1970, 44.

31. Wingate, C. L., et al., Ibid, 1967, 32.

32. Zywietz, F., INT. J. RADIAT. BIOL., 1979, 35.

COPYRIGHT: "Voyenno-meditsinskiy zhurnal", 1981.

10,657
CSO: 1840/1

UDC 577.391:547.962;611.36

EFFECT OF SEROTONIN ON METHYLATION OF CHROMATIN PROTEINS IN RADIATION DAMAGE

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 53, No 5, Sep-Oct 81
(manuscript received 30 Oct 80) pp 84-89

BLYUM, Ya. B., BABENYUK, Yu. D., TSUDZEVICH, B. A. and KUCHERENKO, N. Ye.,
Kiev University imeni T. G. Shevchenko

[Abstract] Experimental conditions are described for investigating the effects of serotonin, a radioprotective agent, x-ray radiation, and radiation + serotonin on the methylation of histone and non-histone proteins derived from rat liver and thymus, as well as on methylase activities. The results showed that, as a rule, irradiation depressed methylation of non-histone proteins, while the effects on histones were variable and to some degree dependent on the organ. A common feature of both the liver and the thymus was depression of methylation of individual histones (with the exception of fractions H-1 and H2B) 12 h after irradiation. Serotonin enhanced methylation of the non-histone proteins 2 h after administration; thereafter, its effects varied with respect to tissue and protein solubility. In vivo and in vitro studies on the effects of irradiation + serotonin on methylases showed that their activities returned to normal levels within 24 h with respect to histone methylation. As yet, no conclusions can be reached as to the effects of irradiation or serotonin on the regulation of methylase activity. References 19: 3 Russian, 16 Western.
[2-12172]

UDC 355.34:007:612.822.3:612.821.1-08

USE OF ELECTROENCEPHALOGRAPHY AND PSYCHOPHYSIOLOGICAL METHODS IN OCCUPATIONAL SELECTION OF OPERATORS

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 5, May 81 pp 52-54

[Article by Professor, Colonel of the Medical Service V. S. Lobzin and Major of the Medical Service Ye. A. Zinchenko]

[Text] It is common knowledge that an operator's work is characterized by high psychological-emotional strain. This makes it necessary to conduct occupational selection which includes electroencephalographic and psychophysiological examination. Electroencephalography reveals latently occurring pathological processes, as well as paroxysmal disorders of the consciousness which could cause interruptions in the operator's activity. Using the characteristics of the bioelectric activity (BEA), it is possible to judge the functional state of the brain, higher nervous activity, and personality qualities of the individual.

We examined individuals of age 25-44 who had not complained of their health. The examinations were made to reveal symptom complexes that were prognostically unfavorable for the operator's activity. The neurological examination did not reveal any pathology. Electroencephalography was performed on 121 people, and of them, 90 were examined with the aid of psychophysiological and personality techniques.

A study was made of the background characteristics of the alpha-rhythm for parietal-occipital points of contact (bipolar method) with closed eyes (CE), visual characteristics of the BEA with open eyes (OE), orienting reaction (OR) to a flash of light, reaction of rhythm assimilation (RRA) to rhythmic photo stimulation, and change in the BEA after 2-minute hyperventilation. The psychophysiological examination included 24 techniques which were adopted in the Navy for selection of operators. These techniques permit study of the main properties of memory, perception, thinking, attention, and the psychomotor system. The psychological features of the personality (extroversion, introversion and neuroticism) were studied by Ayzenok's technique.

The resulting electroencephalograms were separated according to Zhurmanskaya's classification (1963): first type--normal, second--irregular, third--desynchronous (flat), fourth--hypersynchronous, fifth--locally disordered. All the subjects had a dominant alpha-rhythm. No paroxysmal activity was noted at rest or during loads. According to the BEA study data, the first type of EEG was found in 62.8% of the individuals, the second type in 20.7%, the third type in 14% and the fourth type in 2.5%.

The functional state of the brain was assessed by visual analysis of the BEA, parameters of alpha-rhythm , OR, and RRA. Based on current concepts regarding the genesis of the alpha-rhythm (V. V. Dubikaytis, 1975; A. M. Zimkina, V. I. Klimova-Cherkasova, 1978), we considered it possible to characterize the condition of main nervous processes in the subjects with different types of electroencephalograms. Thus, the alpha-activity of the subjects with the first type could indicate smooth and gradual changes in the ratio of inhibitory and activating influences and the balance of main nervous processes. In the second type of electroencephalogram, we observed frequent and jump-like changes in the inhibitory and activating afferentation. In individuals with the third type, flattening of the occipital electroencephalogram could reflect a stable deviation from a certain average correlation towards an increase in the inhibitory or activating effects. The fourth type could indicate the dominance of strong processes of inhibition or excitation.

The frequency characteristics of the alpha-rhythm were as follows according to the types of electroencephalogram: first--10.07±0.03; second--11.04±0.23; third--11.88±0.09; and fourth--10.01±0.53 Hz. The statistical differences in alpha-rhythm frequency between the first and second, first and third, and second and third types ($P<0.05$) could indicate an increase in the functional state of the brain in individuals with the second and third types as compared to the first, as well as in individuals with the third type as compared to the second. It was impossible to reliably confirm the decreased functional state of the brain in individuals with the fourth type of electroencephalogram ($P>0.05$). Study of the RRA showed an increase in the functional state of the brain in individuals with the third type, and a decrease in individuals with the fourth type, assimilation of rhythm in the region of high (third) and low (fourth) frequencies. Assimilation of rhythm generally occurred in the entire spectrum of frequencies in the first and second types.

Table 1. Results of OR Study in Individuals with Different Types of Electroencephalogram, x ± m

Indicator	Types of EEG			
	I	II	III	IV
Reaction time in response to first stimulus, s Confidence interval, $\bar{x}\pm m$	2.1±0.19 1.71-2.49	2.7±0.27 2.12-3.28	4.8±1.23 2.02-7.58	1.6±0.75 0-4.82
Number of stimuli needed to extinguish the OR Confidence interval, $\bar{x}\pm m$	2.8±0.25 2.24±3.36	3.2±0.39 2.36±4.04	4.7±1.11 2.29±7.31	1.3±0.63 0-4.31

It is common knowledge that one can use the data of the orientation reaction study to draw a conclusion regarding the condition of main nervous processes and the extinguishing inhibition (I. A. Peymer, 1955; V. D. Nebylitsyn, 1966). The pronounced nature of desynchronization of the dominant rhythm, the reaction of "arousal" is of primary importance in evaluating disorders in the functional state of the brain from the OR components. Cases of distortion of this reaction in the form of the appearance of the alpha-rhythm in response to stimulation indicate a decreased initial level of the functional state of the brain. The strength of the extinguishing inhibition is judged from the number of stimuli in which the "arousal" reaction is not induced. The OR studies used a flash of light from a photo stimulator (power 0.25 J and duration 50 µs). The lamp was arranged 15-20 cm in front of the subject's eyes. The study results are presented in table 1.

Table 2. Characteristics of Types of Higher Nervous Activity in Subjects, %

Types of higher nervous activity	Types of electroencephalogram			
	I	II	III	IV
By strength:				
strong	100	100	80	100
weak	-	-	20	-
By mobility:				
inhibition and excitation flexible	100	93.4	80	66.7
inhibition inert	-	-	-	33.3
excitation inert	-	6.6	20	-
inhibition and excitation inert	-	-	-	-
By balance:				
inhibition and excitation balanced	90	66.8	50	66.7
excitation dominates	5	26.6	40	-
inhibition dominates	5	6.6	10	33.3

As is apparent from table 1, the reaction in response to the first stimulus was the longest in individuals with the third type of electroencephalogram, and the shortest in those with the fourth. In the first case, this could indicate the dominance of excitation over inhibition, and in the second, vice versa. The strength of the extinguishing inhibition was the least in individuals with the third type, and the greatest in those with the fourth. The boundaries of the confidence intervals can indicate heterogeneity in the reaction. This is especially observed in individuals with the third type (large range in individuals with the fourth type because of a small number of observations). As a result of the OR study, we defined the type of higher nervous activity in the subjects (according to I. A. Peymer, 1955). The study data are presented in table 2.

It is apparent from table 2 that the majority of individuals had strong, flexible and balanced types of higher nervous activity. Weakness, imbalance of the nervous processes, and dominance of inert excitation occurred in combination with the third type of electroencephalogram. Imbalance in the nervous processes because of dominance of inert inhibition was observed in the subjects with fourth type. Inert excitation was found in individuals with the second type of electroencephalogram.

It was found in the study of psychological features of the personality that extreme personality characteristics were found in the combinations: introversion, extroversion and neuroticism with the third type of electroencephalogram, introversion and potential neuroticism with the fourth type. Subjects with the third type of electroencephalogram were characterized both by introversion and extroversion. This apparently indicates that flattening of the electroencephalogram does not depend on the properties of extroversion-introversion, but on the ratio of the main nervous processes. This is indicated by the neuroticism of these individuals. Both the introverts and the extroverts could have unbalanced nervous processes with dominance of excitation or inhibition, although the correlations between them are fairly complicated. However, introversion is more characteristic for individuals with a high alpha-index with open eyes, while a low index (not only with OE, but also CE) is associated with extroversion (N. F. Luk'yanova and V. B. Malkin, 1977).

As N. F. Luk'yanova and V. B. Malkin (1977) believe, the alpha-index with open and closed eyes is associated with different features of the personality, both favorable and unfavorable for operator activity. According to their data, the index with OE is positively tied to the confidence of achieving success, but an excessively high index is negatively tied to such features as courage, calculating and precise mind,and independence in decision making. The alpha-index with closed eyes is negatively tied to uncontrollable aggressiveness, tendency towards drastic fluctuations in mood, extroversion, and at the same time is positively tied to decisiveness, precise mind, high psychomotor tone which is manifest as activity, courage, and readiness for action. Study of the alpha-index with open and closed eyes indicated that the high index was found in individuals with the fourth type of electroencephalogram, and low, with the third type. This is unfavorable for the psychological features of the operator's personality.

In order to evaluate the results of the psychophysiological examination, we employed the method of ranking according to average indicators (the confidence intervals for the entire group of subjects were taken into account). No reliable differences were noted between the average indicators for each technique in the groups with different types of encephalograms. The results of the summary evaluation showed the best indicators in individuals with the first and second types, then with the third and fourth types of electroencephalograms

It is evident that the requirements made of the nonspecific qualities of the operators (without consideration for the analyzer directivity) include characteristics of the main properties of higher nervous activity, and certain personality qualities of the subjects. The nervous processes of the operators must be strong, balanced and flexible. Extreme pronounced nature of neuroticism, extroversion and introversion are unfavorable qualities for operators.

The correlations presented above between the types of electroencephalograms and higher nervous activity, personality and psychological features of the subjects indicate that the majority of individuals had operator qualities, despite the different types of electroencephalograms. However, extremely unfavorable characterstitics of higher nervous activity and personality properties were noted in individuals with the third and fourth types.

It would thus be preferable to select for operator activity those individuals with the first and second types of electroencephalograms, although each specific case needs an individual approach and consideration of the results of a comprehensive examination. The studies made provide the grounds to isolate the symptom complexes which are prognostically unfavorable for operator activity: combination of the third type of electroencephalogram with low values of the alpha-index with OE and CE with weak unbalanced nervous processes and a dominance of inert excitation, introversion, extroversion and neuroticism of the personality, and low values of the psychophysiological indicators; combination of the fourth type of electroencephalogram with high value of the alpha-index for open eyes with imbalance of the nervous processes, dominance of inert inhibtion, introversion and potential neuroticism of the personality, and low psychophysiological indicators.

BIBLIOGRAPHY

1. Dubikaytis, V. V. "Possible Role of Thalamic Pacemaker in Spatial-Temporal Organization of the EEG," FIZIOLOGIYA CHELOVEKA, No 5, 1975, pp 771-782.

2. Zhirmunskaya, Ye. A. "Elektricheskaya aktivnost' mozga v norme, pri gipertonicheskoy bolezni i mozgovom insul'te" [Electric Activity of the Brain, Normally, in Hypertonia and Cerebral Insult], Moscow, 1963.

3. Zimkina, A. M.; Klimova-Cherkasova, V. I. "Neyrofiziologicheskiye issledovaniya v ekspertize trudosposobnosti" [Neurophysiological Studies in Appraisal of Capacity for Work], Leningrad, Meditsina, 1978.

4. Luk'yanova, N. F.; and Malkin, V. B. "Comprehensive (Electroencephalographic and Individual-Psychological, Personality) Evaluation of Capacity for Flight Training," "Metodika i apparatura dlya issledovaniya psikhofiziologicheskikh kharakteristik cheloveka-operatora" [Technique and Equipment for Studying Psychophysiological Characteristics of the Human Operator], Moscow, Nauka, 1977, pp 50-57.

5. Nebylitsyn, V. D. "Osnovnyye svoystva nervnoy sistemy cheloveka" [Basic Properties of the Human Nervous System], Moscow, 1966.

6. Peymer, I. A. "Electroencephalography as an Auxiliary Method of Studying the Activity of the Human Cerebral Cortex Activity in Clinical Practice," ZHURN. NERV. I PSIKH. IM. KORSAKOVA, Vol 55, No 3, 1955, pp 161-170.

7. Penfield, U.; and Jasper, G. "Epilepsiya i funktsional'naya anatomiya golovnogo mozga cheloveka" [Epilepsy and Functional Anatomy of the Human Brain], Moscow, IL, 1958.

COPYRIGHT: "Voyenno-meditsinskiy zhurnal", 1981.

9035
CSO: 1840/366

UDC: 359.6:355.231.41

PERSONALITY STUDIES OF MILITARY SCHOOL CADETS

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 9, Sep 81 (signed to press 16 Sep 81) pp 47-48

[Article by S. P. Rotomskiy, Capt 2d Rank, candidate of engineering sciences, Ye. D. Petrakov, Capt 3d Rank, and A. A. Zubarev, Capt Med Serv]

[Text] We made a study of cadets in the graduating year of a higher military school in order to determine any possible relationship between certain personality distinctions and achievement. We used the standardized method of personality testing (L. N. Sobchik, N. F. Luk'yanova, 1978), which enabled us to make a quantitative and qualitative evaluation of structural elements of personality and determine the correlation between specific personality traits and various characteristics of man's performance, including professional work.

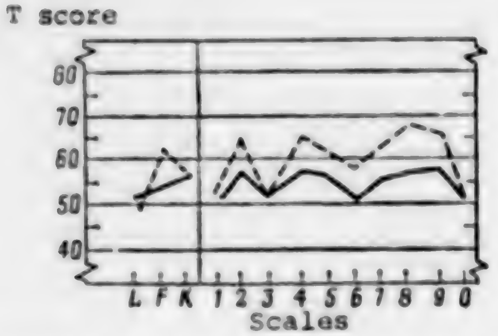
We analyzed student achievement over the entire training period. Two groups of cadets whose achievement was higher or lower than one mean-square deviation from average achievement of all subjects were singled out by means of sigma deviations.

The data obtained by the standardized method were used to determine the average personality profiles (see Figure) characterizing good (first group) or poor (second group) achievers.

This figure shows that the averaged personality profile of the second group of cadets differs in shape from the averaged personality profile of the first group of subjects in that there are peaks on the second, fourth, seventh, eighth and ninth scales and elevation of profile on the sixth. These scales have specific characteristics (N. F. Luk'yanova, 1978).

The second scale (depressions) reflects the degree of pessimism and dissatisfaction. It permits detection of a tendency toward anxiety, fixing attention on failures and disappointments, low rating of one's own capacities in pursuing conceived plans, skepticism, passivity, contemplative attitude toward phenomena of life. High scores on the second scale signify a predisposition for various inadequate reactions in stress situations.

The fourth scale (impulsiveness) permits detection of marked laxity, spontaneous behavior, and it demonstrates a high level of desire to reach a goal, disregard for conventional behavior norms, lack of principle-mindedness in questions of morality, elements of emotional immaturity. High scores on the fourth scale are a sign of poor social adaptation, tension and dissatisfaction.



Averaged profiles in standardized personality tests for the cadet groups studied

The sixth scale (rigidity) refers to the tendency toward inflexibility, lack of mobility of approach to solving different problems and dogmatic persistence. This is manifested in the area of emotional experiences by persistence and slow change in mood, gradual build-up of affect, bearing grudges and stubbornness.

The seventh scale (anxiety) is indicative of indecisiveness and lack of self-confidence. Individuals with high scores on the seventh scale are in a constant state of tension, groundless anxiety and dissatisfaction. For them, adaptation is a long and difficult process.

The eighth scale (individuality) is indicative of degree of individuality and subjectivity in behavior, statements about social adaptation. This scale demonstrates the level of discord between the subject and his surroundings, as well as existing conventional standards, and his inherent originality and unique approach to problem solving.

The ninth scale is the scale of optimism and activity. High scores on this scale are encountered more often at a young age and are indicative of an easy attitude toward various problems, boastfulness and exaggeration of one's own abilities. These elements can demonstrate heightened activity, egocentricity, emotional immaturity and low esthetic interests.

As a result of studying the personality traits of the cadets, we found reliable differences between the groups of subjects referable to the second and fourth scales ($P<0.05$), as well as sixth, seventh, eighth and ninth ($P<0.01$). The differences indicate that nervous [hypochondriac] and anxiety traits are encountered more often or are more marked in poor achievers, and they have difficulty in social adaptation. Such individuals are characterized as being excessively willful, nonconformists, restless, with rapid mood changes, distinctive attitude toward the conventional standards of behavior. Some of them are very active, presenting elements of disinhibition, temperament traits that are close to the impetuous type. These traits are combined with rigidity of thinking, tendency toward forming affectively saturated points of view that are difficult to correct. This group of individuals also presents rapid change in sets, excessive activity that changes to disinhibition.

In addition, there is also a difference between the first and second groups of subjects on the F scale ($P<0.001$), which demonstrates a significant degree of emotional tension and possibility of emotional disorganization in poorly achieving cadets.

The results of this study lead us to the conclusion that personality traits such as anxiety, tendency toward depression, exaggeration of one's own abilities and underestimation of difficulties, as well as unique thinking and emotional reactions, have the strongest influence on cadet achievement.

Consequently, the standardized method of personality testing when screening applicants for higher military schools is sufficiently prognostic. Use thereof can demonstrate with a high degree of probability personality traits of graduates that are instrumental in or a deterrent to good achievement and formation of the qualities of a future officer.

BIBLIOGRAPHY

1. Berezin, F. B., et al., "Student Testing By a Russian Modified Variant of the MMPI," in "Mezhdunarodnyy kollokvium po sotsial'noy psikhologii" [International Colloquium on Social Psychology], Tbilisi, 1970.

2. Berezin, F. B., Miroshnikov, M. R. and Rozhanets, R. V., "Method for Multi-Aspect Personality Testing," Moscow, 1976.

3. Luk'yanova, N. F., "The Correlation Between Pilot Personality Traits and Level of Achievement," in "Voprosy psikhologicheskogo razvitiya lichnosti" [Problems of Psychological Development of the Personality], Tallin, 1974.

4. Idem, "Some Personality Distinctions of Cadets Differing in Flight Training Achievement," KOSMICH. BIOLOGIYA I AVIAKOSMICH. MEDITSINA, No 1, 1977.

5. Sobchik, L. N., "Manual for the Use of the MMPI Psychological Method," 1971.

6. Sobchik, L. N. and Luk'yanova, N. F., "Study of Psychological Distinctions of Flight Personnel by the Standardized Personality Test Method," Moscow, 1978.

COPYRIGHT: "Voyenno-meditsinskiy zhurnal", 1981 .

10,657
CSO: 1840/1

UDC: 616.89-082:65.012.2

SYSTEMS ANALYSIS AS MANDATORY PREREQUISITE FOR UPGRADING PSYCHIATRIC CARE

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian
Vol 81, No 3, Mar 81 (manuscript received 3 Mar 80) pp 426-431

MAZUR, M. A., Kemerovskaya Oblast Psychiatric Hospital (chief physician M. A. Mazur)

[Abstract] Methods of working out standard rehabilitation programs for different groups of psychiatric patients are offered, which take into consideration the nature of the pathological process and extent of social adjustment, and which are a departure from traditional views on structure of the psychiatric service, in that each department is both an element of the overall rehabilitation process, and a stage of rehabilitation. Patients are divided into the following groups: 1) those with favorable course, recent onset of illness and with exacerbations; 2) recent onset with adverse course; 3) employed patients who have been ill for a long time and have frequent exacerbations with personality changes; 4) unemployed, illness of long duration with gross personality changes; 5) patients who have spent many years in a hospital; 6) history of long illness, unemployed for different reasons. The rehabilitation programs are: 1) return to home and productive work; 2) vocational guidance and adjustment to work in industry; 3) extramural therapy at a dispensary; 4) observation in overnight hospital; 5) vocational therapy and vocational training in therapeutic-industrial workshops; 6) treatment in day hospital; 7) observation and treatment in the home ["in-home hospital"?]; 8) first stage of in-hospital rehabilitation. The systems analysis approach is described in detail: how to break down successive objectives into simple elements, formulation of goals and subgoals at each stage of treatment-rehabilitation, with explanatory charts. Figures 3; references 11 Russian.
[344-10,657]

UDC: 616.895.8(049.32)

REVIEW OF A. K. NYMAN BOOK ON NONREGRESSIVE SCHIZOPHRENIA

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian
Vol 81, No 3, Mar 81 pp 467-468

MOSKALENKO, V. D. (Moscow) reviews "Nonregressive Schizophrenia. Clinical Course and Outcome," by A. K. Nyman, ACTA PSYCHIATRICA SCANDINAVICA, Suppl 272, Munksgaard, Copenhagen, 1978, 143 pages

[Abstract] The concept of nonregressive schizophrenia advanced by Nyman refers to a variant not associated with profound personality defect or schizophrenic symptoms classified as grade I by Kurt Schneider, and it is ranked on a par with variants described as latent, borderline, transient, ambulatory, pseudopsychopathic or pseudoneurotic schizophrenia, although there are some distinctions and it cannot be considered a synonym for the latter variants. Nyman discusses comprehensively the premorbid signs, symptoms, course and outcome of this variant; although nonregressive schizophrenia is not something new to Soviet psychiatrists, Nyman's detailed and meticulous comparison of different signs of nonregressive schizophrenia to classical schizophrenia is very interesting. He lists among the various symptoms some that are various degrees or forms of depression, as well as dysmorphophobia, obsessiveness and ritualism. However, over a 6-9-year observation period, 43% of the nonregressive schizophrenics developed symptoms of regressive schizophrenia, whereas 22% of the regressive schizophrenics presented nonregressive symptoms prior to hospitalization in a psychiatric hospital. It is also reported that there was better social recovery than clinical, both being better among women than men. The effects on health of family members of schizophrenics are also discussed, and a patient with the nonregressive form is a greater burden on his family than the "classical" schizophrenic. It is concluded that nonregressive schizophrenia cannot be considered a relatively mild illness. Early detection is mandatory to help both the patient and his family. The data submitted by Nyman are based on the results of his study in Sweden. [344-10,657]

PSYCHOLOGY

UDC: 371.71:[612.825.8:612.822.3

ESTIMATE OF MENTAL EFFICIENCY OF STUDENTS BY MEANS OF EEG

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 81
(manuscript received 8 Jan 81) pp 24-27

PRATUSEVICH, Yu. M., DUBNER, O. L. KVASOV, G. I., MINERVIN, O. N. and SOLOV'EV, A. V., Institute of Hygiene of Children and Adolescents, USSR Ministry of Health, Moscow

[Abstract] The qualitative parameters of mental capacity of students were estimated based on systematic organization of neurophysiological processes in the brain, judged from EEG activity, recorded during performance of intellectual tasks. An automated system based on a "videoton 1010B" computer was used in the study, recording the EEG from 8 referential leads with the reference electrode attached to the ipsilateral earlobe. Problems were selected which depended as little as possible on the students level of knowledge, skill or past experience: selection from among 5 concepts of the one which "did not belong" in the list, extrapolation of the numbers in a series, mental rotation of figures. The systems approach, utilizing a working hypothesis of integrated activity of the entire brain, based on analysis of the development of physiology and psychology from the standpoint of general systems theory, lead to the conclusion that in order to construct a complete natural science picture of the activity of the brain, it is not necessary to merge or identify the physiological and psychological aspects, but rather to construct a "conceptual bridge" to reveal the qualitative specifics of integration of the various neurophysiological processes ss a single whole. The systems approach thus allows two broad classes of phenomena, physiological and mental, to be brought together and allows mental phenomena to be defined through the integrative systems processes in the brain. The practical significance of this work is that it opens a path to physiologically founded determination of individual capabilities of students for intellectual activity and, consequently, to hygienic standardization of intellectual loads considereing the true difficulty of various subjects.
[370-6508]

CSO: 1840

- END -

END OF FICHE

DATE FILMED

Dec. 15, 1981